RUBBER AGE

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RUBBER AGE

Vol. 64, No. 6 MARCH, 1949

The Porous Sheet Process of Drying GR-S

By W. F. BIXBY

B. F. Goodrich Chemical Co., Cleveland, Ohio

WHEN the approach of war in 1940 threatened to cut off our supply of natural rubber, our government began its efforts to stimulate the development of processes for the manufacture of synthetic substitutes. At the time of Pearl Harbor a base of experience had been obtained by industry in emulsion polymerization so that it was possible to design suitable equipment for the preparation of synthetic latices for the huge government-financed construction program of the American rubber industry, which was then placed in high gear. However, at this time very little data had been obtained on suitable production methods of obtaining a satisfactory parcel of dry rubber from these latices. Consequently, considerable experimental work was conducted by industry to achieve satisfactory procedures for this purpose. One of the most efficient methods developed was the porous sheet process of drying GR-S.

Rubber latices, either natural or synthetic, may be coagulated by acid or salts or by a combination of the two agents. The coagulated product thus obtained requires thorough washing to remove residual amounts of these agents, and a drying step to eliminate water and produce a moisture-free rubber which can be put up into packages convenient for handling in transit and in the product manufacturing plants.

Consideration of the washing and drying steps emphasizes that the size and shape of the coagulated particle can be of primary importance in determining the efficiency of these operations. For example, if dilute sulfuric acid is added to latex, the rubber coagulates in a tough, sticky mass which effectively encloses within itself considerable quantities of water and acid. Because of the large size of the spongy mass obtained, the bulk of the water can be effectively removed only by squeezing, and the acid only by working the rubber to expose continuously new surfaces from which residual acid can be washed with water. Subsequent drying is a slow process because heat must flow into the thick, compacted mass to vaporize the remaining water which must then work its way out of the bulk of the rubber through the mechanism of diffusion. The techniques required for such operations are those which have been developed for handling natural rubber and require a considerable amount of heavy machinery.

With GR-S it is possible to conduct first a "creaming operation" by adding a solution of salt (usually sodium chloride) to the latex. This causes a partial flocculation of the latex particles and the latex consistency changes to that of a heavy cream. When this "creamed latex" is added to an agitated bath of dilute acid, relatively non-sticky crumbs are formed. These crumbs are easily washed free of acid because of the large surface area exposed to the washing action. They are also easily dried because the transfer of heat into and water vapor out of the rubber crumbs proceeds readily since the diffusional processes need function only over a short linear distance.

Note: This paper was presented at the Symposium on Chemical Engineering Developments in the Synthetic Rubber Program held by the American Institute of Chemical Engineers at Cleveland, Ohio, May 10, 1948.

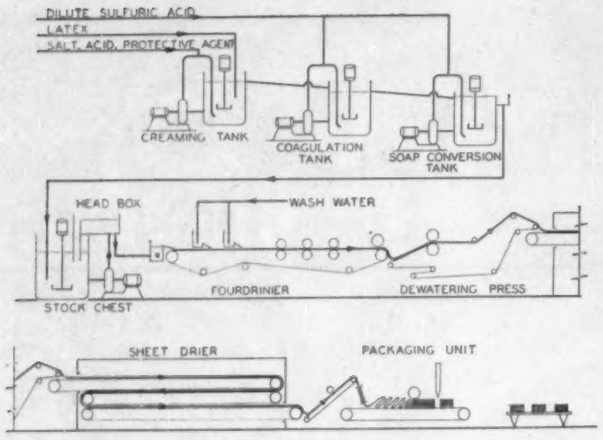

FIG. 1—Diagrammatic representation of the porous sheet process of drying GR-S.

Consequently, if an attempt is made to obtain extremely fine crumbs, the washing and drying operations can be performed most effectively. If, in addition, a high drying temperature is employed to produce a high vapor pressure inside the rubber particles, drying is possible in a very short period of time.

Although theoretically these drying advantages can be obtained by utilizing very small crumbs, the usual crumb type air drier possesses several serious operational deficiencies, e.g., difficulties of supporting a small particle size crumb, the tendency for the small crumbs to be picked up and blown around by the air stream, and the inclination of the crumbs to mat together, thereby reducing the porosity of the bed, decreasing air flow and thus lowering the drying rate.

In order to avoid these difficulties during the drying operation the possibility of forming uniform, small particles into a very thin sheet having large surface area per unit volume yet possessing sufficient strength to be conveyed through a hot air dryer was considered. A survey of possible methods of preparing and drying such a sheet disclosed that paper manufacturers had been carrying out an operation of this kind for many years and suggested the possibility that a similar type of equipment could be utilized in the processing of synthetic rubber.

Development of the Method

There were, however, several important problems to solve in order to realize a process of this sort. First, it is necessary to coagulate the latex in fine, uniform crumbs. This is important to facilitate thorough washing of the rubber and to permit the formation of a thin sheet. On the other hand crumbs must not be so small that they will pass through any supporting surface. Secondly, the crumbs must be deposited evenly on a dewatering screen. Thirdly, in order to obtain thorough washing it is essential that the crumbs immediately after deposition on the screen remain in a loosely-piled condition, avoiding any tendency to agglomerate which could prevent thorough removal of coagulating ingredients. Fourth, following the washing operation it is necessary to induce the crumbs to stick together to provide sufficient sheet strength to allow it to be carried through succeeding stages. Fifth, it is advantageous to mechanically dewater the sheet as much as possible in order to reduce the steam load of the driers. However, this must be performed without reducing sheet porosity to the point where the rate of drying is adversely affected. And finally, after drying has been obtained, the sheet must be made up into some kind of a suitable package for handling purposes. The process as finally developed by the B. F. Goodrich Company is shown diagrammatically in Figure 1.

Coagulation and slurry preparation is carried out stepwise in three tanks. The first operation is the production of a satisfactory flocculated or "creamed" latex. Latex flows from a head tank (Figure 2) at a constant rate to a creaming tank (Figure 3.) Each operation is very closely controlled (Figure 4.) Sodium chloride is added as a solution which also contains a small amount of sulfuric acid to maintain proper pH conditions and a protective agent, the purpose of which will be discussed later. This solution is added, not directly to the tank, but to a high velocity stream of "creamed" latex which is circulated by means of a high capacity pump. This is done to avoid any local high concentrations of the added ingredients in the creaming tank which would cause non-

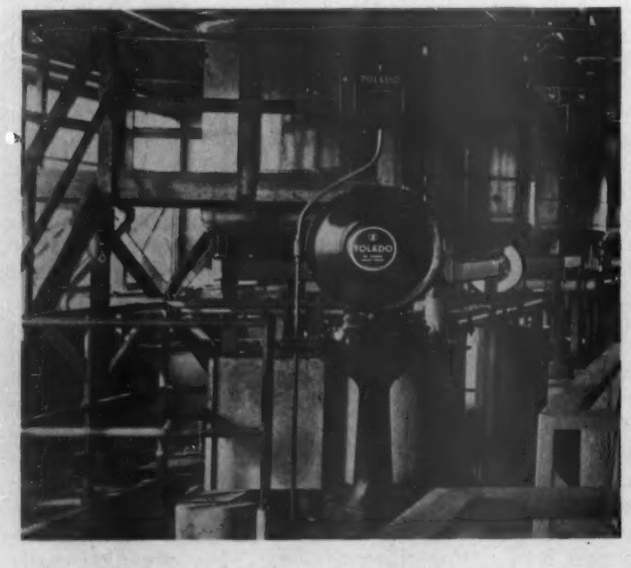

FIG. 2—Latex head tanks. Latex flows from these 1500-gallon glass-lined storage tanks through scale-mounted weir tanks to creaming tanks on the floor below.

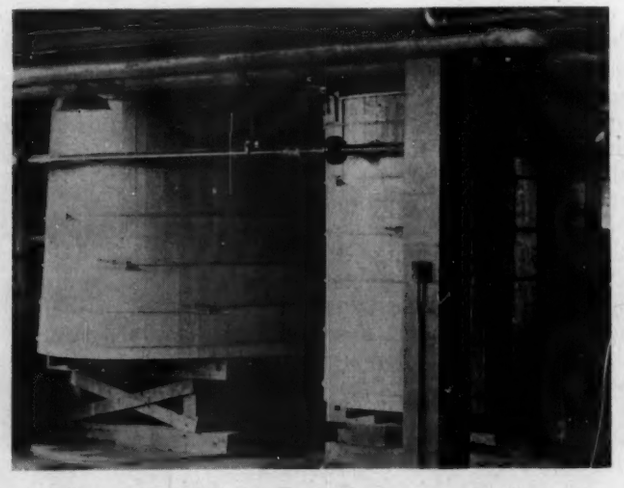

FIG. 3—Creaming and coagulating tanks. Latex and creaming solution are added to the creaming tank (left) while creamed latex flows by gravity to the coagulating tank (right).

uniform flocculation with subsequent difficulty in later steps.

The "creamed" latex then flows by gravity to a coagulating tank (Figure 3). Here sufficient dilute sulfuric acid is added to cause complete coagulation in the small particle size desired. As in the creaming tank, the acid is not added directly to the tank but is injected into a high velocity stream of recirculated slurry to avoid local, high concentrations of acid which would cause non-uniform particle size.

The coagulated slurry flows to the third tank in series, the soap conversion tank. Since the specification established for GR-S requires that all soap present in the latex be converted to free fatty acid, additional sulfuric acid is added in this tank to accomplish this. However, since the acid destroys the residual soap which acts as a stabilizing agent in the preceding tanks, the crumbs would normally flock together in clusters which would make it impossible to form the uniform thin sheet necessary for the drying operation. Consequently, it is essential to add to the system a protective agent which will be effective under conditions of low pH. Such stabilization is obtained with a small quantity of a synthetic dispersing agent which is active in acid solutions. This agent is conveniently added with the flocculating ingredients entering the creaming tank.

The crumb slurry next flows to a stock chest from which it is pumped to a head tank feeding a fourdrinier-type dewatering screen (Figure 5). The slurry flows to a distributing box and thence in a thin layer out on the traveling wire. The serum is drained from the crumbs which then pass under several hot water sprays to wash away residual coagulating ingredients. As the stabilizing action of the protective agent is reduced, the crumbs begin to coalesce, thus providing the sheet strength necessary to the process.

As the wire proceeds, the crumbs pass through a series of press rolls. These rolls squeeze water from the layer and press the crumbs into closer contact thereby improving the sheet strength.

At the end of the fourdrinier the sheet is lifted from the wire and transferred to a dewatering felt. This felt conveys the rubber through a pair of press rolls, one of which is a vacuum roll. As the rubber passes into this press, water is mechanically squeezed from the sheet, passes through the felt and into the press roll from which it is continuously removed by a vacuum pump. This press is instrumental in reducing moisture content from one pound of water per pound of dry rubber to one-third

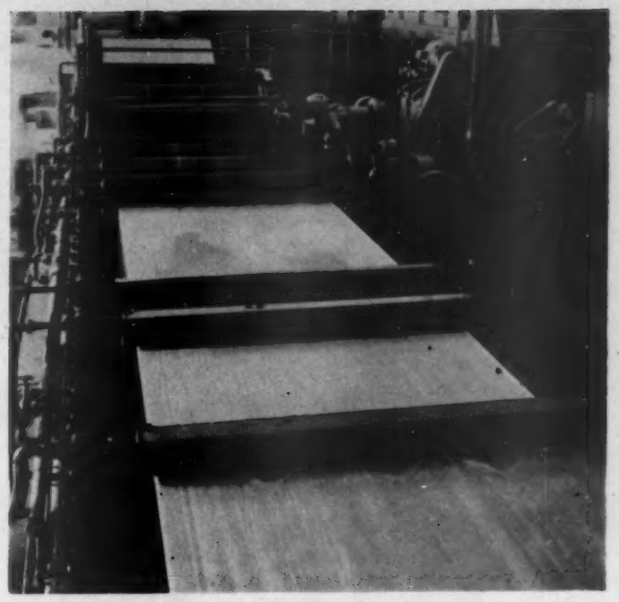

FIG. 5—Sheet formation on fourdrinier. After the serum has been drained from the crumbs, the layer of rubber is washed three times with warm water, then squeezed with a series of press rolls.

pound of water per pound of dry rubber, thus greatly relieving the potential drier load.

The sheet is then transferred from the felt and enters the sheet drier. Here the rubber makes three passes before emerging dry to a packaging unit. This packaging equipment consists of a rotary knife which cuts the sheet into two strips each about 28 inches wide which are then plied up on a moving belt and pressed into a slab which is subsequently cut up into blocks (Figure 6).

Since the success of the whole process depends upon having the proper type of slurry to spread out on a moving screen during the sheet forming operation, attainment of correct procedure of slurry preparation is of paramount importance. This involves balancing of conditions such as salt concentrations, pH, agitation, holdup time, temperature, acid concentration, slurry consistency, and consistent and rigid control of these elements.

Controlling Creaming and Coagulation

One of the most important factors in obtaining the proper type of crumb lies in adequate control of the

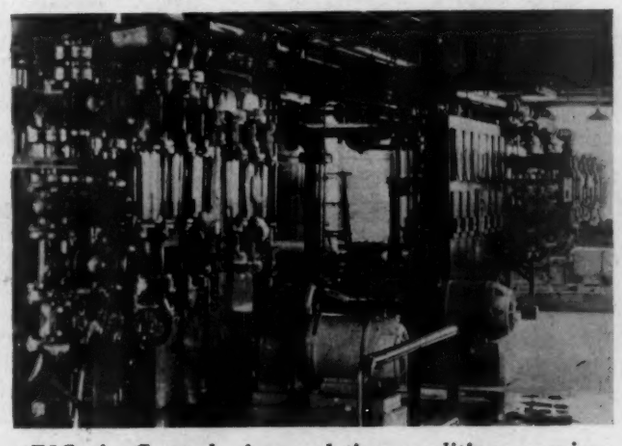

FIG. 4—Control of coagulating conditions requires an impressive array of rotameters and control instruments, as seen in these control panels.

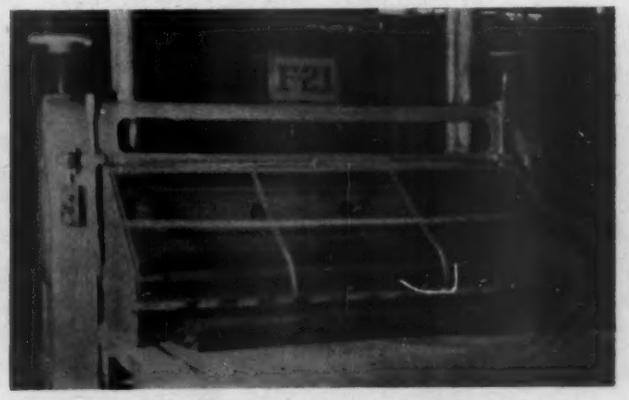

FIG. 6—After plying, the rubber is pressed into slabs on this machine, the slabs subsequently being cut up into blocks.

creaming operation. Salt concentration, temperature and pH must be adjusted so that a barely perceptible flocculation occurs in the creaming tank. Agitation in this tank is not critical provided the incoming salt solution and the latex stream are thoroughly mixed with the batch of creamed latex. If the flocculating solution is injected into recirculated creamed latex, a simple propeller mixer will provide sufficient agitation to completely mix the incoming latex stream with the tank contents. pH adjustment can be most easily accomplished by adding small amounts of sulfuric acid to the salt solution as called for by a pH controller having electrodes mounted in the tank. The proper pH level for this tank is critically dependent upon the age of the latex and it is necessary for operators to watch closely the appearance of the cream to see that proper conditions are obtained especially when starting up a line with latex that may have been kept in storage longer than normal.

Creaming the latex results in a partial neutralization of the charges on the latex particles thereby causing flocculation. Sufficient holdup time must be allowed to permit the attainment of the proper degree of readjustment of the remaining charges on the surface of the flocked particles. Too short a holdup time will result in the formation of oversize non-uniform crumbs during the subsequent coagulation step, while excessive holdup time will produce in the coagulation tank fine stable crumbs which do not readily form a sheet during later treatment.

Coagulation must be carried out to obtain a small uniform crumb suitable to the formation of a thin porous sheet. The important factors in this operation are: condition of creamed latex, pH in coagulating tank, temperature, slurry concentration, and the method of mixing the incoming streams of acid and creamed latex into the contents of the tank. The effects of the condition of the creamed latex have already been discussed. pH in the coagulating tank is important because too low a value will result in an oversize crumb with a tendency to stick and form flocked masses. Too high a pH will result in too small a particle size which may cause trouble in succeeding operations in one of two ways. If the hold-up time during coagulation is fairly long and an aged latex is being run there will probably be an excessive amount of fines which will be lost through the sheet forming screen. A fresh latex on the other hand may result in flocking in the next operation with the result that proper feeding to the forming screen will be impossible.

Since pH control is so important in this tank it is essential that the acid stream be thoroughly and immediately mixed with the tank contents to avoid any local high concentrations of acid. This is accomplished effectively by circulating the slurry through the high capacity pump and adding the acid to the circulated stream in the pipe line rather than directly to the tank. In this way the acid is mixed thoroughly and instantly under conditions of high turbulence. Circulating capacity is such that the complete tank contents are turned over once every two minutes. With this method of operation pH can be maintained with a surprising degree of constancy, which in turn insures the crumb uniformity essential to the process. Proper provision must also be made to mix the creamed latex with the tank contents. This can be assured by providing a tank agitator and taking care to provide proper location of inlet and overflow openings to prevent short circuiting of feed. Correct tank design and proper placement of the discharge from the circulating pumps are also important in this respect.

The stabilizing agent which is added to the system to prevent formation of clusters in the soap conversion tank must be one which will be effective under conditions of low pH and in the presence of sodium chloride. This stabilizing agent must have the further characteristic that it can be easily removed or inactivated once the crumb has been deposited on the forming screen in the desired form. While there are many of the synthetic sopes which have stabilizing power under acid conditions there are relatively few which combine this with the characteristic of producing a crumb which can be easily and quickly destabilized in order to form the sheet. Sulfonated naphthalene is one of these. Consequently, a small percentage of such a protective agent (just sufficient to prevent agglomeration when the pH is lowered to the value needed for complete fatty acid conversion) is added to the coagulation system. Although this protective agent does not exert its desired influence until the pH is lowered to attain conversion of the soap to fatty acid, it can be added to the system previously at any convenient point. In the development of the process it was added originally with the soap destroying acid, but later it was found convenient to add it with the salt solution in the creaming tank.

When the slurry discharges to the soap conversion tank, further acid addition then has essentially no effect on particle size but does serve to convert the remaining soap to fatty acid. Sufficient holdup time must be provided to allow diffusion of acid into the rubber particles to secure complete conversion. Control of pH condition in this tank does not require the degree of sensitivity essential in the two preceding stages. The important factor is that pH be kept sufficiently low to insure complete conversion under the conditions of time and temperature existing in the vessel. Because of the presence of protective agent the intensity of agitation required in the coagulation tank is unnecessary. Moderate agitation designed to secure continual circulation and counteract the flotation tendencies of the crumbs is all that is necessary.

Since constant rate of feed of a uniform slurry concentration is essential to proper sheet formation, the contents of the stock chest are pumped continuously to a head box from which the slurry flows to a distributing channel for the sheet forming machine. In order to prevent flotation of crumbs in the head box a considerable quantity of slurry is pumped, the excess overflowing and returning back to the stock chest.

Forming Uniformly Thin Sheets

Formation of a uniformly thin sheet on the dewatering screen depends primarily on the ability to feed a thin layer of slurry of uniform concentration continuously to a moving dewatering wire. Attainment of this objective is complicated by a tendency of the rubber particles to float and flock together in the distributing trough. Agitation may be employed to prevent this, yet this agitation must be so gentle that the stream of slurry flowing to the wire proceeds smoothly with no turbulence or ripples. Design of the distributing trough has developed into an art. However, by the elimination of corners which might cause accumulation of crumbs and the incorporation of rotating agitators in the distributing channel it is possible to obtain satisfactory feed characteristics.

One of the secrets of forming a good sheet on the dewatering fourdrinier lies in the ability to obtain a flow rate of the slurry layer immediately before deposition on the moving screen wire, exactly equal to that of the wire itself. When this condition prevails, the slurry will flow on the wire smoothly and be dewatered evenly as the screen progresses. Without this characteristic the sheet will be uneven and exhibit tendencies to crack when dewatering takes place. Correct operation may be con-

sidered almost a fine art, depending on the adjustment of many items, each seemingly small in itself, but which, taken cumulatively, profoundly affect the results obtained. The adjustment of all of these details lies within the realm of the head operator. Since the difference between successful and unsuccessful operation may depend upon his ability to achieve the proper relationship of these factors, the machine operator becomes one of the most essential men involved in the operation of the whole plant.

Upon deposition of the crumbs on the moving wire, excess serum is drained to a receiver tank from which some is used to prepare acid for the coagulating streams. The rest runs to the sewer.

Once deposited on the wire, the crumbs must be destabilized so that they will possess sufficient tendency to stick together to provide sheet strength for the drying operation. This can be done by washing with warm water. However, since the rubber crumbs are uniformly small round balls each with a coating of protective agent, it is essential to apply this water with the greatest care to avoid disturbing the position of the crumbs on the screen. This has been accomplished by flowing the water on the layer of crumbs, again essentially at the rate of speed of the wire in order to achieve a minimum of disturbance. Good results are obtained with a distributing trough placed above the sheet with a discharge chute the width of the wire which lays the wash water directly on top of the crumb layer. Several such wash sprays are employed for destabilization.

Sheet strength can be built up further by squeezing the sheet carefully with the press rolls to force the crumbs into closer contact. These rolls are counterweighted so that the exact degree of pressure can be applied to get sheet compacting without sheet cracking. Care must, however, be exercised in making press roll adjustment to prevent sticking the sheet to the wire. While the stability of crumbs can be broken most readily by hot water, it has been found that warm rubber can be forced easily into the screen so solidly that it will not come free when the sheet is ready to be handled and removed from the wire.

This tendency to stick can be counteracted by chilling the sheet and this is done by spraying cold water into the discharge bite of the rolls where it is immediately sucked into the pores of the sheet. It has also been found useful to employ below the wire an upwardly directed stream of cold water possessing sufficient force to raise the sheet momentarily from the wire immediately after each set of these press rolls. By the expedient of cooling and loosening the sheet after each set of rolls it is possible to apply greater pressure at each succeeding set of rolls and thereby secure greater sheet strength.

Just before leaving the wire the rubber sheet passes under a couch roll. This is a pressure roll whose surface characteristics and position on the wire are such that the sheet has a preferential tendency to stick to it rather than the wire, thereby making it easy to transfer the sheet to another carrier for further treatment.

At this point the sheet is removed from the traveling wire screen and is transferred to a felt belt traveling at essentially the same speed as the wire. The lower roll of the suction press is a perforated cylindrical roll possessing a valving arrangement so that suction is applied to the felt just as it passes through the bite of the rolls. Consequently, as the sheet and felt pass, water is mechanically squeezed from the rubber and travels through the felt into the suction roll. This device is extremely effective in reducing moisture content without destroying sheet strength.

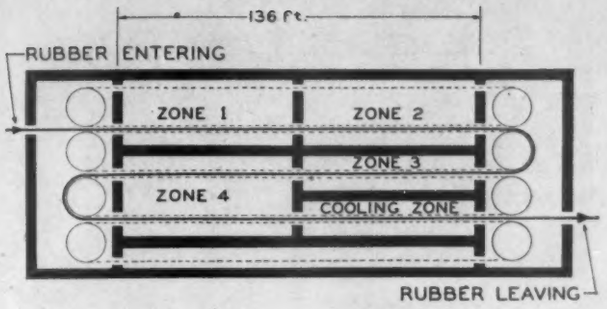

FIG. 7—Schematic diagram of sheet drier.

Operation of the Drier

After leaving the felt, the sheet of dewatered rubber, which, however, still retains the porosity essential to rapid drying, is led to the first pass of the sheet drier (Figure 7). This drier consists essentially of three endless screen belts, which serve as carriers for the sheet. It is divided into several drying zones, each of which has its own temperature control system, and a cooling zone. Each drying zone is equipped with a circulating fan handling air at high velocity and recirculating it through heating coils. These fans each have a capacity of 20,000 cubic feet per minute. They pick up air at the ends of the drier and blow it through ducts to the middle where it passes the heating coils and enters the proper drying zones. In these zones the air passes parallel to the sheet at velocities as high as 2000 feet per minute. By placing the fans to apply suction at the ends of the drier any leakage at the air locks is into the drier. This avoids uncomfortable blasts of hot air which might otherwise harass operators working at the ends of the dryer.

The rubber sheet is carried into the drier on a screen belt of the cyclone type having a mesh of about 1 inch. The screen may be of light weight construction since only a small amount of rubber is carried. Because of the high velocities of air used for drying it is necessary to prevent flapping of the sheet which would result in tears and breaks. This is conveniently performed on the second and third passes by the first and second screen belts on their return trip. For the first pass it is necessary to employ another belt provided expressly for this purpose.

Because of the heat capacity of the metal screen the rubber may exhibit a tendency to stick to the same belt during its return trip rather than lie on the next belt in series. This is prevented by employing an air blast directed on the sheet from the inside of the belt at the end of each pass. This effectively blows the sheet from the carrier screen.

With this drier it has been found possible to employ high temperatures in the early zones, since the moisture content of the sheet is high. In these zones most of the moisture is removed but the sheet temperature remains low because of the presence of water. High air velocity is utilized to obtain good conditions of heat and mass transfer. The first three zones, comprising the first three half passes, are operated in this manner.

The fourth zone of the drier may be considered more of a soaking chamber. Here the moisture content is lower and the transfer of heat into and water vapor out of the sheet is dependent to a somewhat greater extent upon diffusion. This zone is therefore made larger than the preceding zones, the rubber remaining in it twice as long as in any one of the others. Since surface film coefficients are less important from the standpoints of both

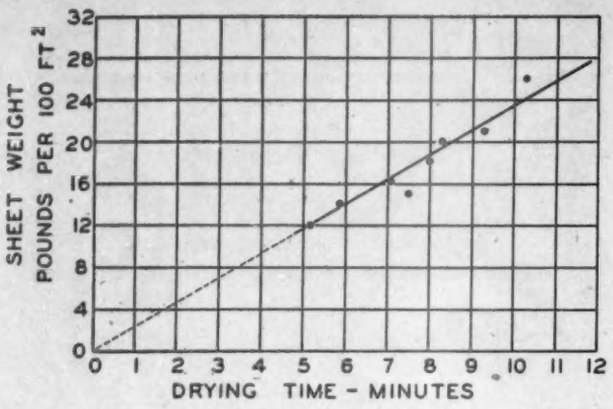

FIG. 8—Effect of sheet weight on drying time. (Air Velocity, 1500 feet per minute; Air Temperature, 230° F.; Initial Moisture, .45 lbs/lb dry rubber; Final Moisture, 0.005 lbs/lb dry rubber).

heat and mass transfer, lower air velocity is employed, about one-half that of the previous zones. Temperature is adjusted to provide thorough drying without overheating the rubber. Close temperature control is essential in this section.

The fifth zone is the cooling chamber. This comprises the last half pass of the drier. Cool air from outside is sucked into this zone and passes along the sheet to the center of the drier where it is discarded. A good heat transfer coefficient is needed here to cool the sheet sufficiently so that the rubber may be built up into bales for shipment without any deleterious heat effects occurring during subsequent storage. A high capacity fan is used for this purpose.

One source of trouble which must be avoided in this type of drier is the accumulation of rubber on the carrier wires. Any bits which adhere to the wires will soon become thoroughly heat-softened, with the result that they will stick to the sheet of rubber with which they come in contact on the next circuit. As the sheet is transferred to the next screen a piece may be pulled from it, forming a larger chunk which also becomes heat-softened. If this process continues unheeded, a sticky ball of rubber will eventually break the sheet and cause considerable trouble. However, trouble of this nature is prevented quite easily by installing rotating brushes for each belt at convenient points. Experience has shown that they need not be operated continuously, about 30 minutes operation per shift being sufficient to maintain bright, shiny conveyors at all times.

No difficulty is experienced with starting up operations in this type of drier since the sheet merely drops from one carrier to the other, the belts being so located to make this automatic. The continuous sheet removal jets prevent any tendency of the sheet to come back on the same belt.

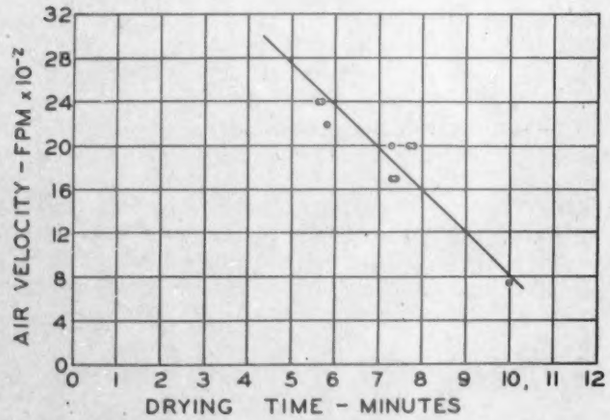

FIG. 9—Effect of air velocity on drying time. (Sheet Weight, 18 lbs. per 100 sq. ft.; Air Temperature, 230° F.; Initial Moisture, .45 lbs/lb dry rubber; Final Moisture, 0.005 lbs/lb dry rubber).

Factors Influencing the Drying Rate

Theoretically there are many factors which influence the drying rate, among these being temperature, air velocity, particle size, porosity of the sheet, and sheet thickness. Actually it is found that particle size and sheet porosity are by far the most important factors. Fundamentally, the whole success of the process depends on the operations during coagulation and the formation of the sheet. Improvement in sheet porosity by adjustment and close control in these previous steps can do more than any variation in drying conditions.

With a porous sheet it is found that sheet weight, air velocity and temperature exhibit influences, the effects of which are rather easily correlated. For example, drying from a given initial moisture content to a final specification value at a constant temperature and air velocity requires a time which is directly proportional to the sheet weight (Figure 8). Although there is some scattering of data points due mainly to the difficulty of obtaining the same porosity on successive samples, a straight line passing through the origin can be considered satisfactory representation of the data.

With constant sheet weight and temperature the drying time between given initial and final moisture conditions varies inversely as the air velocity, over the range of velocities studied (Figure 9). Again there is some scattering of data points due to differences in the porosity of the samples, but a straight line serves quite well to indicate the relationship in the range studied.

With constant sheet weight and air velocity moderate changes in temperature have relatively little effect provided the temperature level is generously above the boiling point of water. For example, the drying time at 260°F is less than one quarter minute lower than at 237°F, when the total drying time is about 5 minutes. This indicates that the major factor is the removal of water vapor from the surface of the rubber. The gas film at the surface of the rubber particles is, therefore, the controlling resistance both in getting heat to the rubber and in getting the water vapor away. Therefore, air velocity

TABLE I—TYPICAL DRIER OPERATING CONDITIONS

Air Temperatures
- Zone 1—290°F.
- Zone 2—278°F.
- Zone 3—278°F.
- Zone 4—278°F.

Sheet Moisture
- Rubber entering—.41# water/# dry rubber
- End of First pass—.11# water/# dry rubber
- End of Second pass—.01# water/# dry rubber
- End of Third Pass—.001# water/# dry rubber

Conveyor Speed—30 feet per minute
Weight of Sheet—.9 pound per square foot
Production Rate—8000 pounds per hour

past the rubber sheet is of paramount importance in this type of dryer to minimize the effect of this gas film. This is markedly illustrated by the relationship previously shown (Figure 9).

It can thus be seen that diffusion of heat into and of water vapor out of the rubber crumbs is of minor importance in this type of drying. This is largely the result of the small particle size of the coagulated rubber, about ½ millimeter in diameter, so that the distance through which heat and mass diffusion must take place is kept to a minimum.

In considering the sheet drying data given above one correlation is interesting. If sheet porosity and other operating conditions are kept constant, then in a drier of given length, no increase in production can be obtained by changing the weight of the sheet. To illustrate, if a sheet is run twice as heavy, the required drying time will be twice as long, which means that the drier speed must be reduced to one half of its original value. This will result in a production the same as that originally prevailing.

However, though at first seemingly a contradiction of this reasoning, a good operating crew can actually run a higher production rate by using a heavier sheet. Again the answer lies in sheet porosity. By running a heavy sheet gauging ¼" or more, it is possible to obtain sufficient sheet strength to carry through the drier with a more porous sheet. Operation for maximum production then becomes a nice balance of sheet porosity and sheet strength. It is interesting to note that experienced machine crews in production plants are able to handle very porous, thick sheets and achieve production rates well above those for which the equipment was designed.

Under production operating conditions the drying temperatures are often maintained as high as 280° to 300°F (see Table I). Yet a uniform high quality of rubber is produced with no effects of heat deterioration. This is possible because the rubber temperature remains low until most of the water has been removed. Sheet temperatures seldom exceed 170°F before the sheet has passed through 80% of its drying period. Since the remaining holdup time in the commercial driers so far constructed cannot be more than 2¼ minutes at the slowest possible belt speed no deleterious effects can occur even if the rubber temperature rises above this value during the remainder of the drying period.

The maximum drying time that it is possible to obtain in the production driers developed for this process, i.e., drying time at the lowest conveyor speed, is 11-1/3 minutes. Actual operation usually is carried out with a drying time of 7 to 8 minutes. Under these conditions only a few minutes production of rubber will be in the drying section at any one time. Consequently, the drier need not be constructed heavily but can be made of lightweight conveyors and can use relatively simple and inexpensive driving and carrying mechanisms.

This simple, lightweight drier has advantages in several ways. It makes possible the utilization of inexpensive construction involving a minimum of capital outlay. The drier, while fairly long, does not require much headroom (Table II) and can be housed in a building of moderate height, thereby reducing building costs.

TABLE II—PHYSICAL CHARACTERISTICS OF DRIER

Over-all length	144 feet
Width	8 feet
Height	8 feet
Number of passes	3
Passes used for drying	2½
Passes used for cooling	½
Number of drying zones	4
Number of cooling zones	1

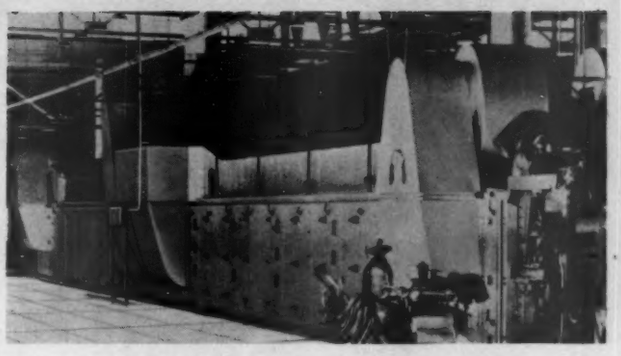

FIG. 10—Porous sheet air drier. Rubber sheet makes three passes before emerging dry.

The simplicity of construction is also of great advantage in maintenance operations. It is not necessary to employ costly corrosion-resisting alloys in this type of drier and consequently an expensive array of special spare parts need not be maintained in stock. Replacement of belts when necessary is a simple matter because of the lightness of the wire wesh used. Such a replacement can be made in a few hours. Because of the wide mesh employed to support the sheet, there is no difficulty with the conveyors becoming fouled with rubber and interfering with heat transfer, thereby requiring lengthy and costly shutdowns for cleaning operations.

The short drying time makes it possible to establish the correct drying temperatures rapidly during startup operations since the effects of changes will be quickly reflected in the rubber leaving the end of the drier. This factor, coupled with the low drier holdup, makes it possible to operate the drier with a minimum of off-specification stock.

Commercial driers of this type (Figure 10) have produced well over 100,000 long tons of rubber in the government rubber program. Individual driers were designed to produce 2,500 pounds per hour of finished rubber, but the development of the process and equipment has been so satisfactory that the design basis has been far exceeded. Experience with this equipment has resulted in continuous average operation at 8,000 pounds per hour and peak capacities during test runs as high as 10,000 pounds per hour per drier.

Conclusion

In conclusion, by utilizing the porous sheet process for drying GR-S, it is possible to obtain a high quality rubber under rapid drying conditions. Because of the small size of the crumbs which make up the porous sheet, high temperatures can be employed safely to dry the rubber so rapidly that the physical properties are not adversely affected. Consequently, it is possible to utilize a drier of lightweight construction which is easy to maintain in good working condition. This type of drier contains only a small amount of rubber in process permitting close control of drying operations and minimizing the chances of producing sizable quantities of off-grade stock.

ACKNOWLEDGMENT

The commercial application of the process described in this paper for the manufacture of GR-S was carried out under Government sponsorship as part of the Rubber Reserve synthetic rubber program.

Application of Very Fine Furnace Black In Low Temperature GR-S

By H. A. BRAENDLE, C. W. SWEITZER, and H. C. STEFFEN
Columbian Carbon Co., New York 17, N. Y.

COLD rubber marks a forward stride in the synthetic rubber program which, as Dinsmore has pointed out *(1)*, is essential to our defense. Cold rubber is a stronger rubber than standard GR-S *(2)* but has been regarded as more difficult to process. The difficulties have been in large measure due to the use of a small particle oil black in the early work with low temperature polymers. Statex K, a fine furnace carbon made from natural gas, eliminates this handicap and yet provides maximum road wear, superior flex life, and improved aging.

Mooney Viscosity

Past difficulties in processing and loss in production with cold rubber were due not to the polymer but to the carbon used, as shown in Fig. 1.

Masterbatches of L.T.P. (X-485) with 50 p.h.r. of carbon were prepared in a laboratory Banbury over a range of temperatures. Two carbons were compared, a small particle oil black and VFF carbon (Statex K) made from natural gas. While the VFF carbon stock showed a moderate linear increase in Mooney viscosity with temperature, the oil black stock whose viscosity was already at a higher level at 240°F. showed an accelerating increase in viscosity from about 300°F. onward.

In general, high speed Banbury temperatures rise well above 300°F. It will be noted from Fig. 1 that the Statex K master mixed at 375°F. was no stiffer than the oil black master mixed at 240°F.

Carbon-Gel

The rise in Mooney viscosity with mixing temperature

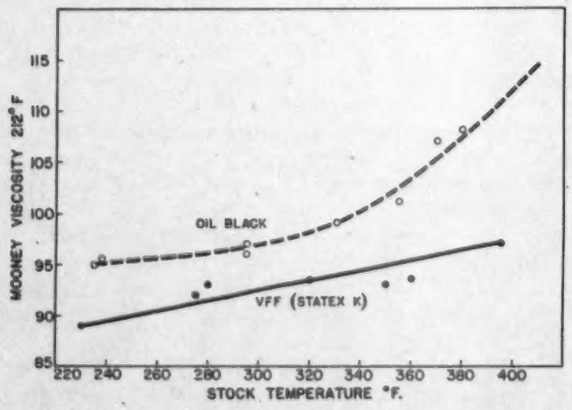

FIG. 1—Mooney viscosity vs. stock temperature for 50 p.h.r. carbon masterbatched in X-485.

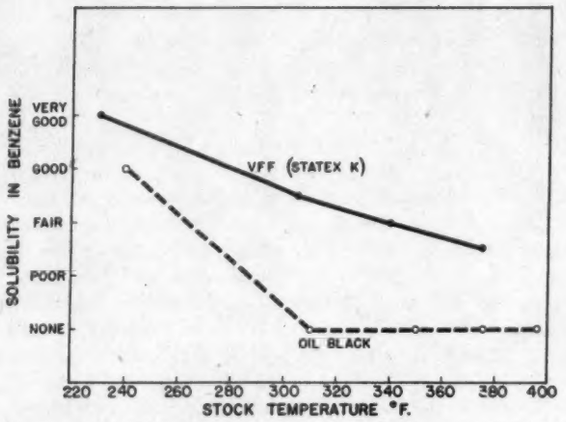

FIG. 2—Solubility vs. stock temperature for 50 p.h.r. carbon masterbatched in X-485.

is usually attributed to carbon-gel formation and the results shown in Fig. 1 may be viewed as evidence of this. Further evidence of the improved behavior of the VFF carbon-cold rubber master, viewed from this angle, is shown in Fig. 2. Samples of the stocks prepared for Fig. 1 were mill sheeted, portions dropped into benzene, shaken for 12 hours, allowed to settle for 36 hours, and the mixtures examined for solubility. The containers were then upended. If the cement was black, thinning out to a colloidal brown, solubility was called "very good." If no solution was obtained, and the original sharp edges of the sample remained, solubility was rated as "none."

The difference in behavior of the two stocks is apparent. If lack of solubility in benzene is due to carbon-gel, the complete gelation of the oil black stock at around 300°F. confirms the viscosity-temperature relationships of Fig. 1 and explains why Statex K-cold rubber treads are being regularly processed with even greater safety and ease than standard GR-S.

Modulus

Fig. 3 shows that normal factory processing temperatures (300° to 375°F.) develop with VFF the full modulus required for wear but not the excessive stiffness which entails dangerous shortness.

Oxygen Sorption on Carbons

In Fig. 4 is shown a significant chemical difference between VFF carbon and the oil black. These carbons

were subjected to 750°F. for varying times in an air oven. The rate of oxygen pick-up was determined by measuring the volatile of the samples. The oil black has the greater avidity for oxygen. This holds even at lower temperatures as shown in the following table:

OXYGEN SORPTION ON CARBONS

Treatment	Per Cent Volatile	
	VFF Carbon	Oil Black
Untreated	0.89%	1.23%
72 hrs. @ 350°F.	1.42%	2.50%
17 hrs. @ 450°F.	1.60%	2.57%
1 hr. @ 750°F.	4.28%	6.22%

Oxygen Sorption of Cold Rubber Treads

This difference in oxygen avidity between the two carbons suggested investigation of their aging behavior in rubber. Vogt *(3)* found that in a tire stock aged in an oxygen bomb, gas black gave the greatest increase in combined oxygen, and also the greatest loss in tensile product. Winn, Shelton and Turnbull *(4)* studied the role of carbon blacks in the oxidation of GR-S vulcanizates. They found that Statex B and Furnex adsorbed only half as much oxygen as channel black.

Using a gain-in-weight method, samples of cold rubber tread were exposed in the oxygen bomb. Results are shown in Fig. 5. The oil black retains its oxygen avidity in the cured tread. Other rubbers give similar results as shown below:

PER CENT OXYGEN SORPTION OF TREAD TYPE COMPOUNDS

Polymer	Hours in Oxygen Bomb	Oxygen Sorbed	
		VFF	Oil Black
X-485	24	.20	.31
	48	.24	.39
	96	.41	.75
GR-S-10	48	.16	.22
Hevea	48	.21	.39
	72	.46	.75

Elongation

Elongation is a prerequisite for good flex-crack resistance, aging and tear — all cardinal factors in tire life. Drogin, Bishop and Wiseman *(5)* have recently published data bearing on this property. Percentages calculated from their data are shown in the following table:

ELONGATIONS OF VFF CARBON AS PER CENT OF OIL BLACK
(after Drogin, Bishop and Wiseman)

Polymer	Elongation	
	Unaged	Aged
Hevea	114%	129%
GR-S-10	116%	119%
X-435	122%	125%
X-485	122%	119%

The advantage of VFF carbon over the oil black is seen to hold not only for cold rubber but for all the polymers.

Factory Compounding and Processing

The following Statex K cold rubber tread was processed in an Ohio tire plant:

Cold Rubber X-485	100.0
Statex K	50.0
Zinc Oxide	3.5
Stearic Acid	2.5
Paraflux	3.0
Circosol 2XH	5.0
Santocure	1.125
Sulfur	2.0

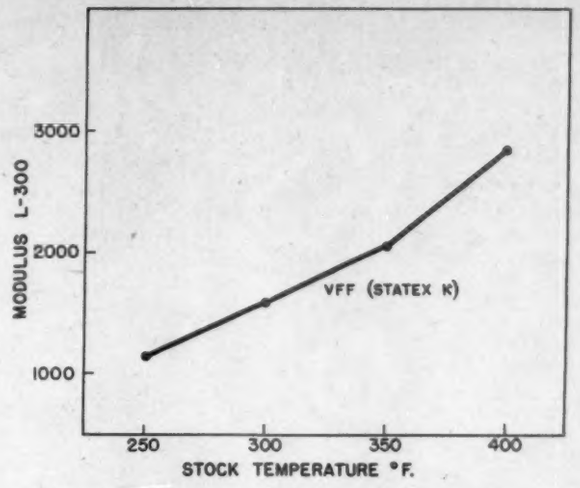

FIG. 3—Modulus vs. stock temperature for 50 p.h.r. in X-485.

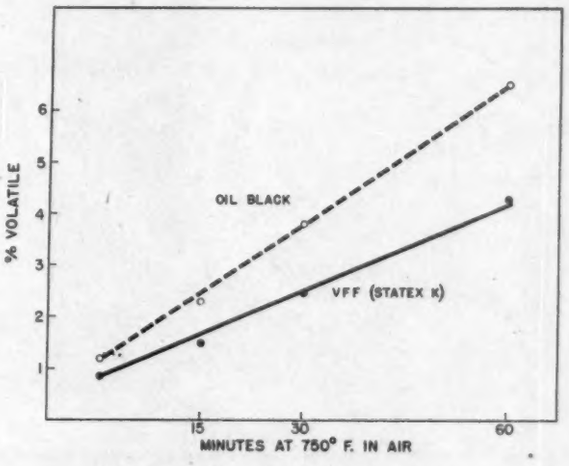

FIG. 4—Oxygen sorption in air.

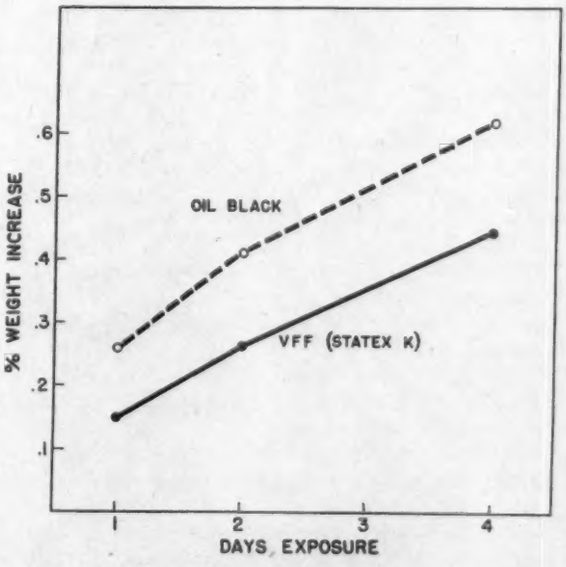

FIG. 5—Oxygen sorption in cold rubber treads in Bierer-Davis bomb.

Data on the factory mixed stocks are given below:

FACTORY MIXED X-485-STATEX K TREAD COMPOUNDS

	Run 1	Run 2
Banbury	#11	#11
Black Master (392 lbs.)	7' at 20 RPM	7' at 20 RPM
Dumped at	260°F.	260°F.
Remill	4' at 40 RPM	4' at 40 RPM
Dumped at	350°F.	375°F.
Finish	4' at 20 RPM	4' at 20 RPM
Dumped at	240°F.	245°F.
Mooney Viscosity	63	61
Unaged		
Modulus L-300	1560	1650
Tensile	3650	3650
Elongation	565	550
% Rebound	57	59
Oxygen Bomb Aged		
Modulus L-300	1820	1800
Tensile	3100	3175
Elongation	510	505

The combination of good elongation with full modulus should be noted.

Road Tests

The tires of the above table were run on a test fleet under the following conditions:

TIRE TEST CONDITIONS

Tire Size	6.50 x 15
Pressure	28#
Overload	20%
Speed	60 MPH
Road	All pavement
Location	S. W. Texas

Two test tires (full treads) and two controls were used alternating around the car. At every 1,000 miles the tires were rotated one position on the car. Under these conditions the tread processed at 375°F. rated 5% better. At 26,000 miles 40% of the non-skid still remained. Throughout the tests there were no signs of tread cracking or tread separation. Actual wear results were as follows:

TIRE WEAR VS. MILEAGE (Run 2)

Miles Run	Miles per Mil Wear
8,700	110
17,404	118
26,300	124

Tires compounded with the oil black to the same Mooney values gave a wear rating of 119 miles per mil.

Conclusions

1. The scorch and processing handicaps of cold rubber have been overcome through the use of VFF carbon (Statex K).
2. VFF carbon (Statex K) has lower oxygen sorption and better oxygen bomb and air oven aging than a small particle oil black.
3. Cold rubber treads compounded with VFF carbon (Statex K) combine trouble-free processing with maximum road wear, flex life and aging.

ACKNOWLEDGMENT

The authors wish to make due acknowledgment to Mr. W. B. Wiegand, vice-president of the Columbian Carbon Co., at whose suggestion this investigation was initiated, and to thank the company for permission to publish the results of the investigation.

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(1) *India Rubber World*, Vol. 119, p. 618 (1949).
(2) Tuley, W. F., *Rubber Age (N.Y.)*, Vol. 64, p. 194 (1948).
(3) Vogt, W. W., *Ind Eng. Chem.*, Vol. 17, p. 870 (1925).
(4) Winn, H., Shelton, J. R., and Turnbull, D., *Ind Eng. Chem.*, Vol. 38, p. 1052 (1946).
(5) Drogin, I., Bishop, H. R., and Wiseman, P., *Rubber Age (N.Y.)*, Vol. 64, p. 309 (1948).

Flexible Surface Type Pyrometers

Flexible shaft surface type pyrometers, especially designed for use in the rubber, plastics, chemical and allied industries, are currently being featured by the Cole Instrument Co., 1320 South Grand Ave., Los Angeles 15, Calif. Models 107 and 108 are equipped with flexible metallic shafts for making surface temperature measurements in all applications where inaccessibility is a problem. Model 107 is provided with a protected thermocouple for use where the surface to be measured is rough, abrasive, adhesive or in motion, such as platens, rolls, extrusion presses, etc. Model 108 is equipped with an unprotected thermocouple tip for use on smooth stationary surfaces where quick readings are desired such as in the various recesses of molding and casting dies for phenolics and metals. Both models are completely self-contained and simple to operate. It is necessary only to bend the flexible shaft to a position which will allow the thermocouple to contact the surface where the temperature reading is desired. A special pistol grip handle permits the instrument to be hung on a hook when not in use. An extremely long, easily read scale reads directly in degrees of temperature. Scale length is 2.6 inches. Accuracy is 2% of full scale value.

Van Dorn Plastic Scrap Granulator

A new plastic scrap granulater, designed primarily for grinding rigid thermo-plastic scrap, although it can be used for other rigid materials, has been introduced by the Van Dorn Iron Works Co., 2685 East 79th St., Cleveland 4, Ohio. Known as Model G-100 Grinder, it is a complete unit mounted on a base. The one-piece alloy steel rotor is ball-bearing mounted and coupled directly to the motor. Knives are of alloy steel, three revolving while the other two are stationary and adjustable. To facilitate cleaning, the chute and hopper openings are hinged, the hopper can be easily taken off by removal of three bolts, and the hinged end plate permits fast removal of the screen. The grinder has a capacity up to 50 lbs. per hour, depending upon type and size of the material. The hopper throat opening is 3 x 3-5/8 inches. The unit is 36 inches long, 20 inches wide, and 48 inches high. It weighs approximately 400 pounds.

Roy E. Roth Co., Rock Island, Ill., has announced the availability of special **stainless steel pumps** which will resist corrosion. The pumps have a capacity of 2 to 180 g.p.m. and 0 to 400 head feet in water. The manufacturer claims the pumps can develop high pressures in a single stage.

Quality Control of Factory Mixed Batches of Rubber Compounds

By PAUL E. GNAEDINGER

Dominion Rubber Co., Ltd., Montreal, Quebec, Canada

CONTROL chart methods can assist in controlling the uniformity of batches of compounded rubber stocks by improving interpretation of tests on measureable qualities, analyzing charts from process recorders, and providing a continuous record of various inspections.

Statistical theory plays an important part in the interpretation of data. Processed material by any test will vary, but if the variation arises from a constant system of causes, the variability will be uniform and confined to predictable limits above and below an average value. When observations fall outside these statistical limits (which may differ from specification tolerances) they are probably influenced by some unusual cause of variation and the test or material should be investigated further.

Thus, the emphasis is shifted, for instead of simply accepting a given batch for further processing or rejecting it, the data is used as a test for homogeneity of the process. If a test indicates that a batch is significantly different from its predecessors, an attempt is made to find and remove undesirable causes.

This paper assumes some elementary knowledge of chart control techniques and avoids repetition of general procedures. By discussing typical applications from actual experience, it emphasizes results which can be obtained from the use of control chart methods.

Note: This paper was presented before the Rubber Division, Chemical Institute of Canada, Montreal, Canada, June 9, 1948.

Variability

Ever since the earliest days of rubber processing most of the quality obtainable from calenders and extruders has been controlled within the limits of the skill of the operators of these machines. Compounded rubber is an exceedingly variable and versatile material. Variations in the quality of stocks to be calendered or extruded can be compensated by varying processing conditions such as time, temperature and manipulation of the material. Intimate knowledge of the interaction of these variables comprises the operator's skill.

The reason why skill is required at these operations is basically because of the difficulty of delivering to the machines a material which is stable and uniform—and it *is* difficult. As the demand increases for greater precision from these primary conversion operations, it sometimes becomes apparent that either the necessary skill is deficient or is not consistently applied. Thus a need exists for improving the uniformity of the compounded stocks delivered from the mixing operations.

Uniformity of raw stock quality is influenced by:

1. The raw materials used, which may vary from lot to lot.
2. The operators, who vary from man to man, from day to day, and hour by hour, in skill, knowledge and procedure.
3. The machines, which vary due to design, condition and adjustment.

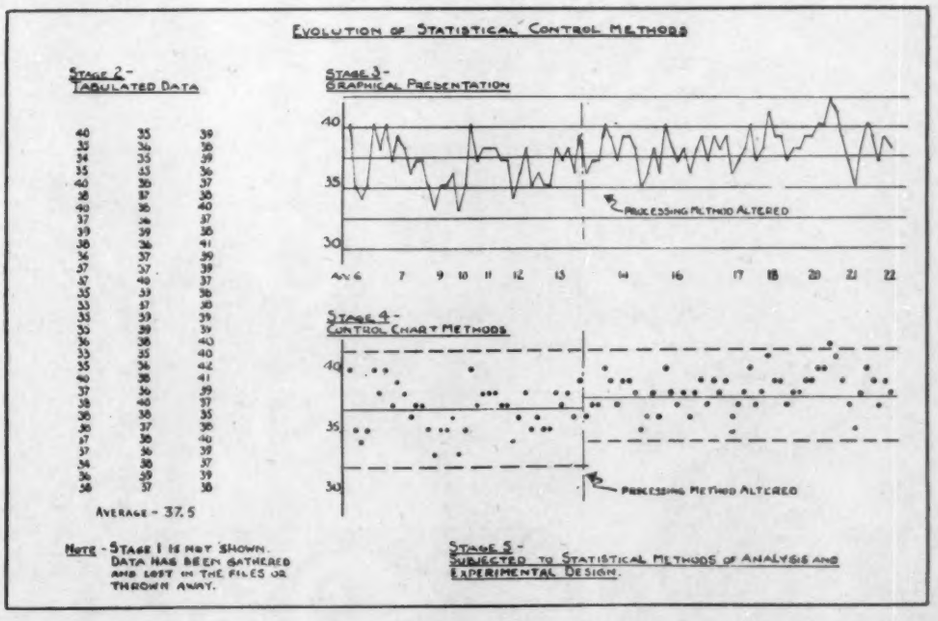

EVOLUTION OF STATISTICAL CONTROL METHODS
STAGE 2 - TABULATED DATA
AVERAGE - 37.5
NOTE - STAGE 1 IS NOT SHOWN. DATA HAS BEEN GATHERED AND LOST IN THE FILES OR THROWN AWAY.
STAGE 3 - GRAPHICAL PRESENTATION
PROCESSING METHOD ALTERED
STAGE 4 - CONTROL CHART METHODS
PROCESSING METHOD ALTERED
STAGE 5 - SUBJECTED TO STATISTICAL METHODS OF ANALYSIS AND EXPERIMENTAL DESIGN.

FIG. 1

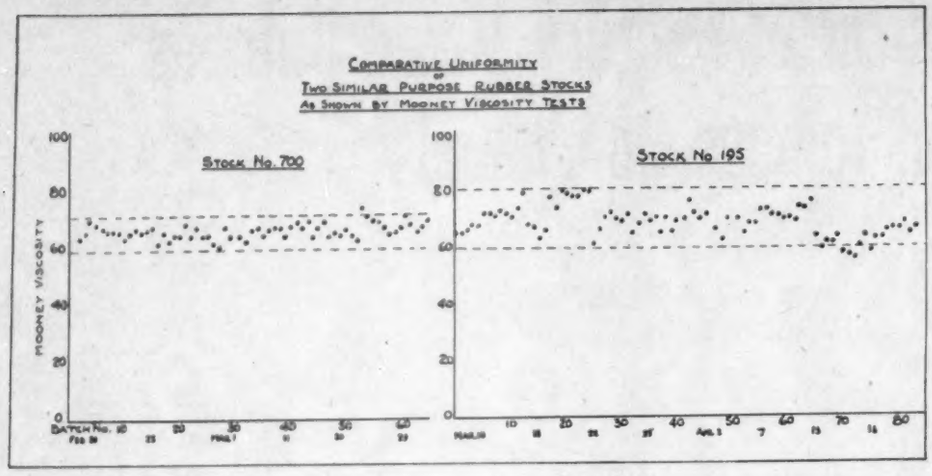


FIG 2

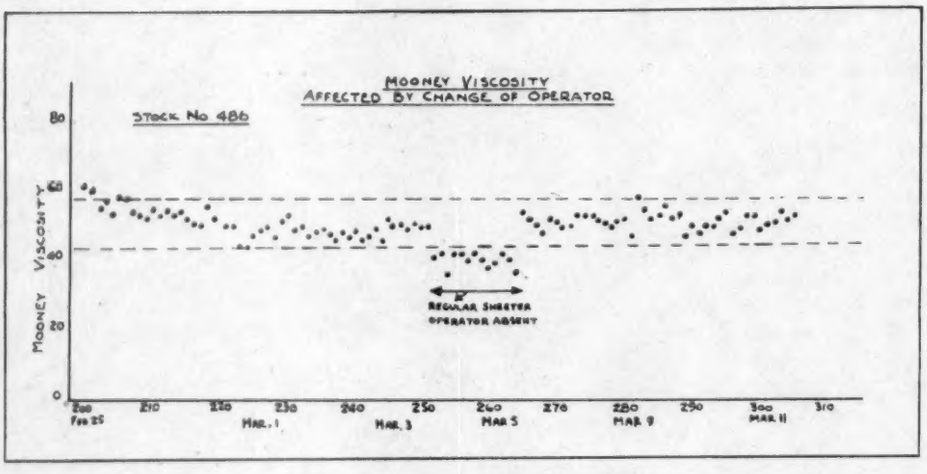
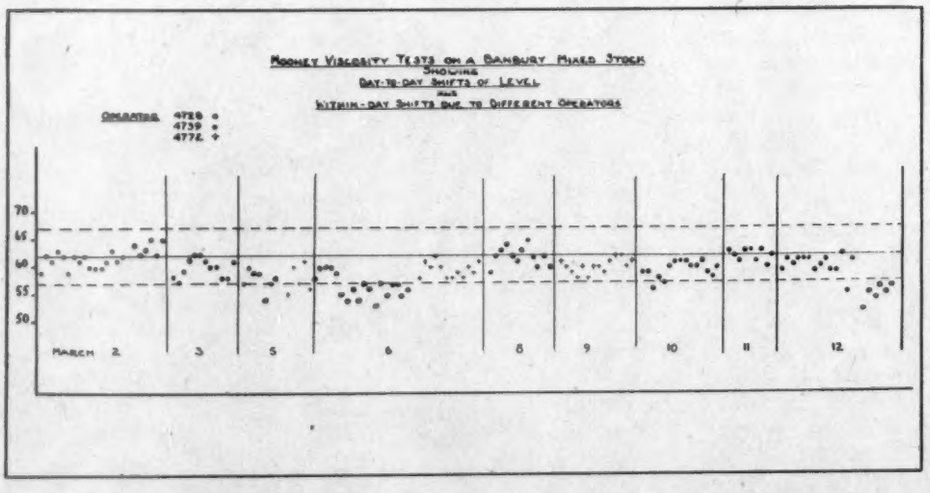


FIG. 3

FIG. 4



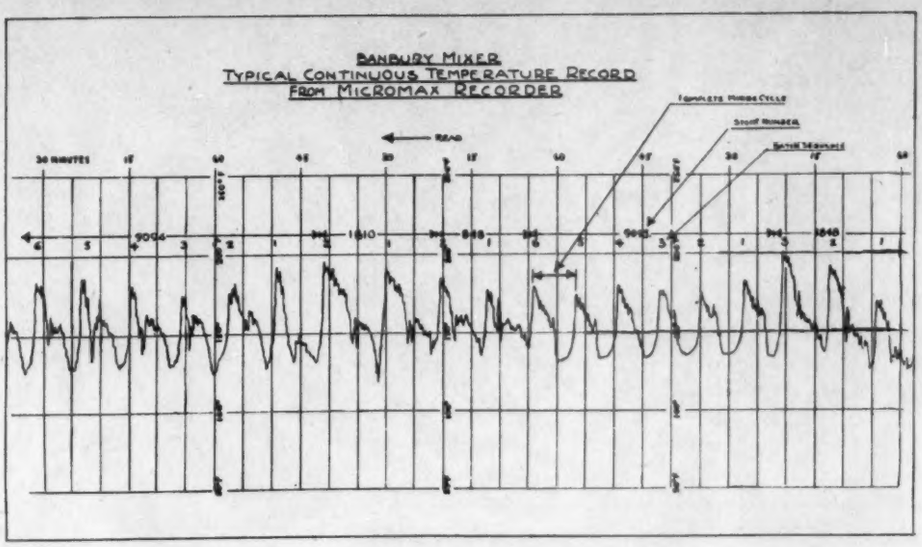


FIG. 5

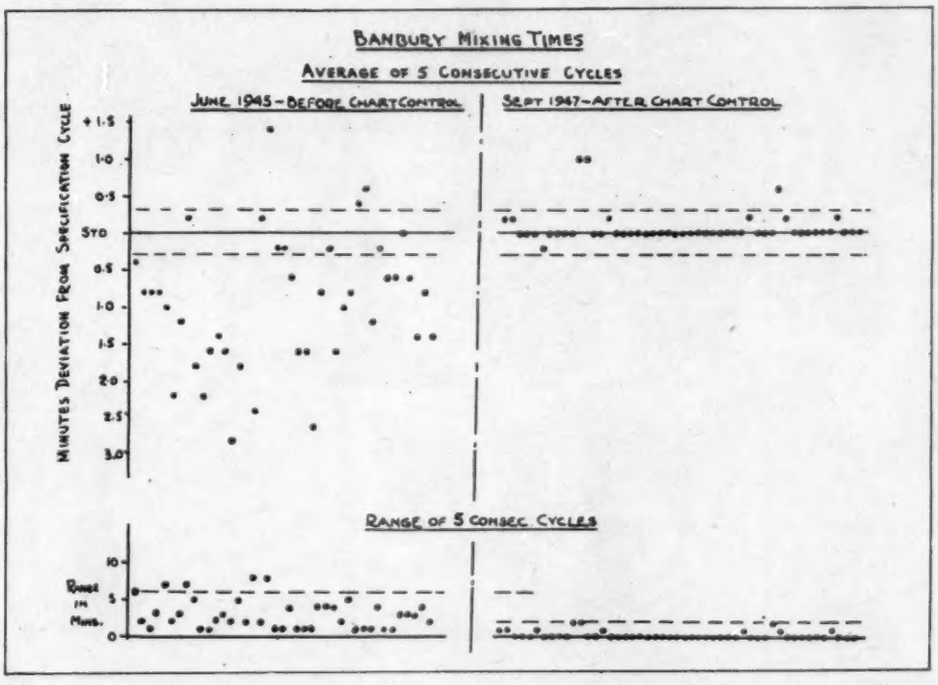


FIG. 6 (ABOVE)

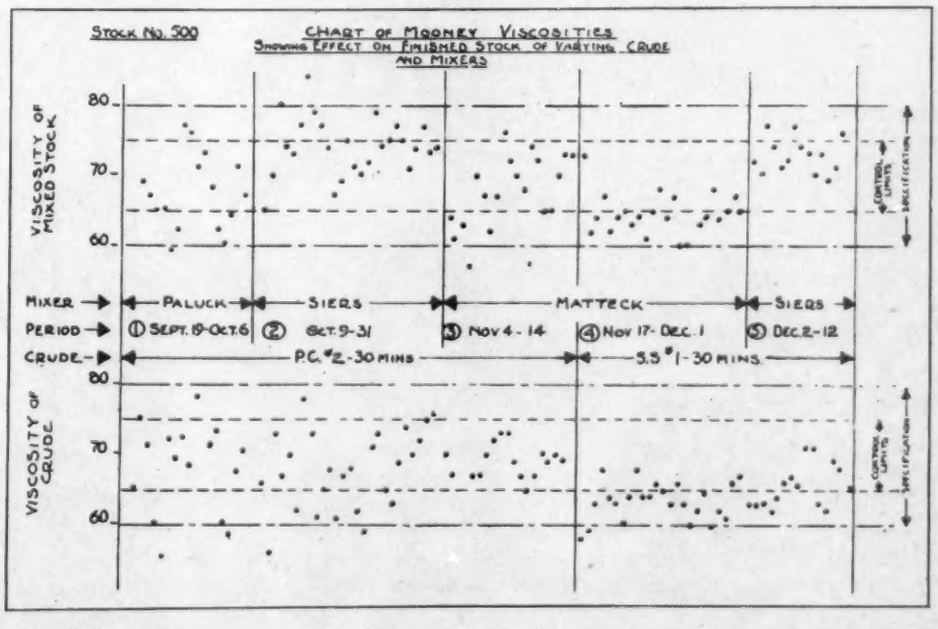

STOCK NO. 500
CHART OF MOONEY VISCOSITIES
SHOWING EFFECT ON FINISHED STOCK OF VARYING CRUDE AND MIXERS
VISCOSITY OF MIXED STOCK
80
70
60
CONTROL LIMITS
SPECIFICATION
MIXER → PALUCK → SIERS → MATTECK → SIERS
PERIOD → ① SEPT. 19-OCT. 6 ② OCT. 9-31 ③ NOV 4-14 ④ NOV 17-DEC. 1 ⑤ DEC. 2-12
CRUDE → P.C. #2 - 30 MINS → 5.5 #1 - 30 MINS
VISCOSITY OF CRUDE
80
70
60
CONTROL LIMITS
SPECIFICATION

FIG. 7

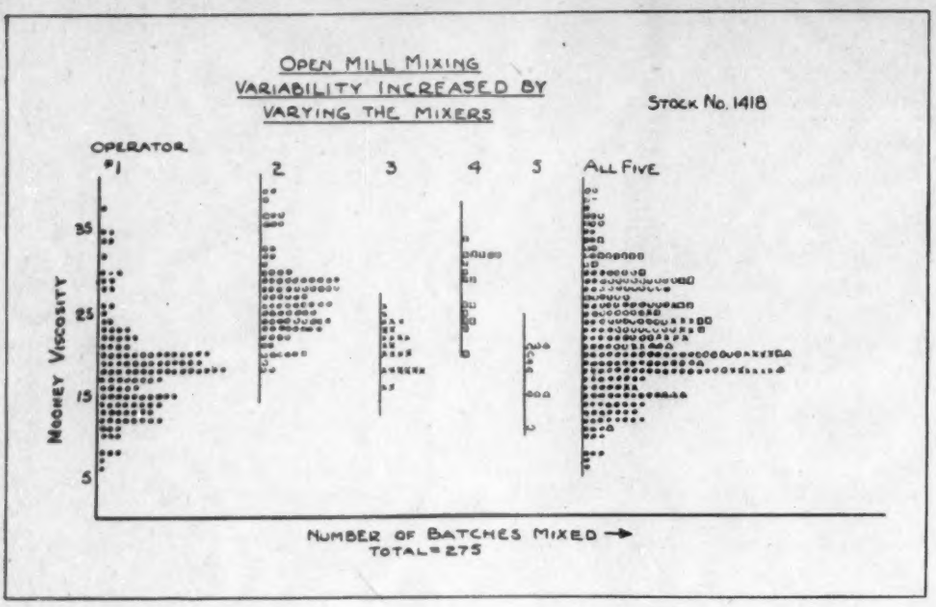


FIG. 8

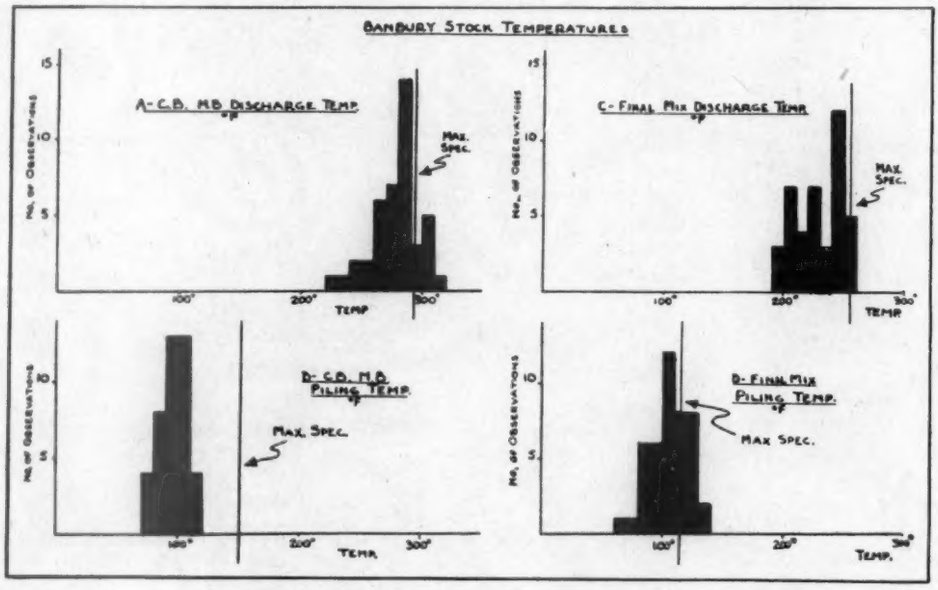


FIG. 9

All of these variables are operating all of the time resulting in the production of material which varies from batch to batch and within the homogeneity of a single batch.

Some of these variables are difficult to segregate, possibly some do not need to be. Usually, statistical analysis of test data taken from the finished batches will indicate whether refinement of analysis is necessary. In many cases control chart methods used for displaying data to the operators arouses sufficient interest on their part to result in marked improvement in uniformity.

Evolution of Statistical Control

Figure 1 describes the evolution of statistical control methods. In its crudest form control is exercised by making visual observations or measurements without recording them, the picture being carried mentally.

The second stage is represented by a tabulation of observations which, at some later time, can be analyzed.

Stage three illustrates conventional graphical presentation which has a great advantage over tabulation because the salient features can be grasped very quickly. This presentation, however, has some shortcomings which are illustrated in stage four.

Stage four is the control chart method of presentation, and it will be noted that the distinctive features of this are that it shows changes in the degree of variability of quality from period to period, and also that it illustrates changes of quality level instead of trends which are sometimes over-emphasized in the simple graphical method. The dotted lines on the control chart are limits of expected variation determined statistically and serve the purpose of drawing attention to data which may represent departures from normally expected performance.

Control Chart Applications

Figure 2 shows an application of control charts illustrating the difference in variability between two stocks of similar purpose and nature. A chart of this type imme-

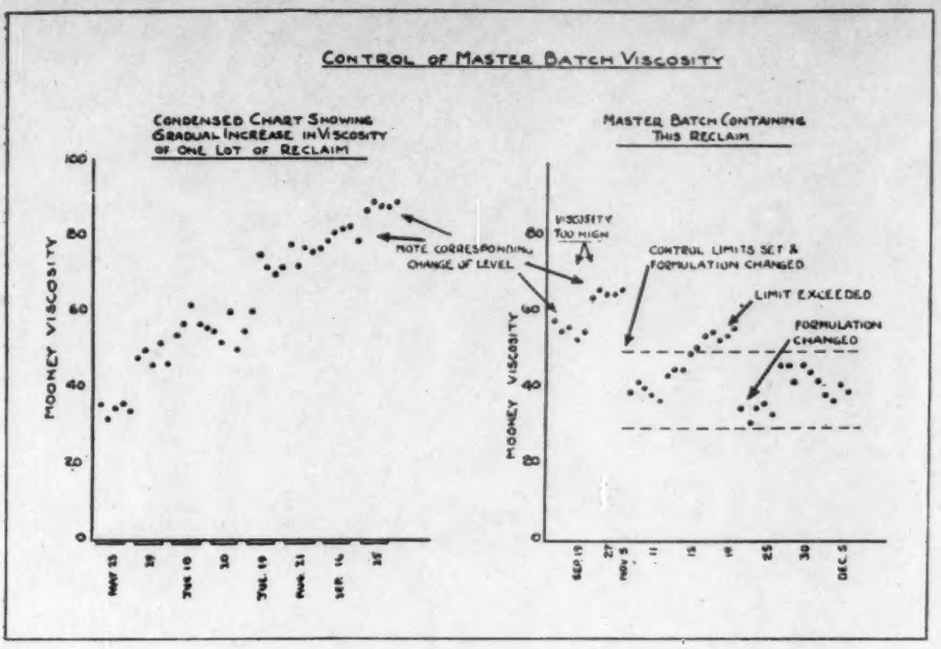

CONTROL OF MASTER BATCH VISCOSITY
CONDENSED CHART SHOWING GRADUAL INCREASE IN VISCOSITY OF ONE LOT OF RECLAIM
MASTER BATCH CONTAINING THIS RECLAIM
MOONEY VISCOSITY
NOTE CORRESPONDING CHANGE OF LEVEL
VISCOSITY TOO HIGH
CONTROL LIMITS SET & FORMULATION CHANGED
LIMIT EXCEEDED
FORMULATION CHANGED

FIG. 10

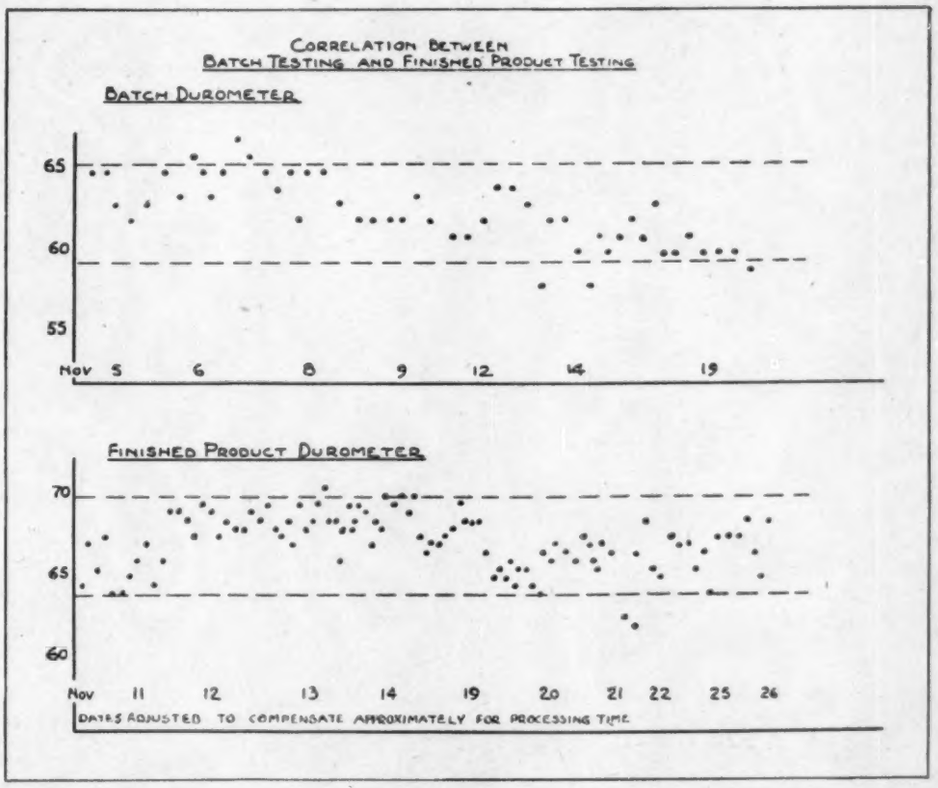


FIG. 11

diately raises such a question as "why does stock No. 195 vary so much more than stock No. 700?"

Test data, even by the most precise methods of determination, will vary. This variation is usually due to variations in the men, materials and machines which produce the material tested and in the test itself. When one material shows greater variability than another it is usually because one or other or a combination of these factors affects it more than the other. The accompanying illustrations show how control charts depict the extent of these variations.

In Figure 3 is shown the effect of changing an operator. Batches 252 to 265 inclusive were not mixed by the regular sheeter operator, with the result that the level of quality of these batches was quite different to those preceding and following.

Note in Figure 4 how the average level of quality shifts from day to day and also within each day there is a shift of level. This chart shows that quality does vary. Variation of this type is present in many processes. Sometimes the effects are not important, but sometimes they are. It is frequently useful to know why quality varies. In this case variation was chiefly caused by changes of operator.

Operators can affect quality by failure to adhere to standard processing times, temperatures or procedures. When these variables are difficult to control, the use of chart analysis assists in determining the effect that departures from standard may produce. Such evaluation assists in deciding upon the steps which should be taken to obtain better uniformity. It is not always easy to present the available data in control chart form.

Converting Recorder Charts

Figure 5 shows a typical chart from a temperature recorder. The peaks and valleys can be used to measure the cycle times of the mixing operation, as illustrated on the chart. This type of chart is, however, difficult to analyze without spending an excessive amount of time on the analysis. Note, for example, stock No. 9095 where six consecutive batches were mixed.

It is obvious that the cycles followed in this case were not identical because the pattern of the chart is not uniform. This variability can be concisely evaluated by measuring the time of duration of each successive cycle, averaging them, and finding the difference between the longest and the shortest. This will give two indices of uniformity of mixing time, the average cycle time and the "range". By comparing the average time to the specified time we can tell whether the batches have been mixed long enough or not, and if we examine the range we can detect whether the batches have been mixed uniformly.

Figure 6 shows such a record where groups of five consecutive batches have been taken hour by hour, day after day, from the recorder chart. On the upper part of the chart is shown the deviation of average times from the standard, and on the lower part is shown the range of each five consecutive batches. A comparison of the right hand chart with the left shows the improvement in uniformity which has been obtained by analyzing batch times in this way.

Figure 7 illustrates the quality variations of a group of batches mixed on open mills. The upper part of the figure shows the viscosity of the final mixed stock, and the lower part the viscosity of the crude rubber supplied for each batch. During the first three periods with one type of rubber which varied somewhat but held to a uniform average level, the quality of the stock mixed varied due to changing the mixer, operator Siers producing a higher viscosity than the other mixers. However, at the beginning of period No. 4 a different type of crude rubber was supplied, and the quality of the finished stock became softer without changing the mixer. Consequently, in period No. 5, the operator was changed and the quality of the stock came back to the required level.

Frequency Distributions

The frequency distribution is a useful means of presenting data, as it gives a concise picture of certain aspects which may not otherwise come to light.

Figure 8 shows the frequency distribution of tests on one type of stock obtained from five different mixers. It will be noted that there is a considerable difference in level between several of the group. If several mixers are used from time to time to mix a given stock it will not be as uniform as if the work were confined to one mixer. This is illustrated in the combined distribution of five.

The condition of equipment may have an important bearing upon the quality of output. Figure 9 shows how a frequency distribution analysis helped to solve an unsatisfactory processing condition. It shows frequency distributions comparing the discharge temperature and piling temperature of two Banbury mixers after the stock had passed through a three-stage cooling tank.

Note that Figure 9-a shows discharge temperatures considerably above the specified maximum, whereas in Figure 9-c the discharge temperatures were easily maintained below a lower maximum. Investigation of the equipment revealed the coolant water circulating pipes were badly corroded and insufficient water was being supplied to the Banbury shown in 9-a.

Figure 9-d shows that baches were piled too hot, but according to Figure 9-b it should be possible to cool the stock to the required temperature. Investigation showed that one section of the cooling equipment was not functioning properly, and when corrected, the temperature fell below specified maximum.

Correlation of Tests

The control chart in the left of Figure 10 shows the progressive hardening of one lot of reclaim during a four-month period. The right hand figure shows the tests on mixed batches containing this reclaim. It will be noted that there is very close correlation between the hardness of reclaim sampled on September 16 and 25 compared to the finished stock containing these lots which was mixed on September 19 and 27.

Installation of a control chart provided the means for observing the changes in the finished stock as the reclaim hardened up and appropriate action as soon as the limits were exceeded resulted in improved control of the finished batch quality. This figure serves as an example of how raw materials may affect processed quality and how control properly applied will produce greater uniformity.

In Figure 11 tests on finished product and tests on the raw stock processed are compared. It will be noted that changes in the level of the raw stock are reflected in the quality of the finished product. This implies that if control is attained during the early stages of processing, finished product characteristics will be under better control. Thus, testing of the final product can be reduced in the knowledge that if the raw materials are satisfactory and subsequent processing is according to specification, the finished product quality must be uniform and acceptable. Final inspection and testing is then done more as an assurance of continuing acceptable outgoing quality level instead of only a means to separate the bad product from the good being shipped.

Conclusion

It is generally recognized that undesirable variations sometimes exist in a product. The foregoing examples illustrate how variability can be presented in a concise easily-comprehended manner. However, charts by themselves cannot correct unsatisfactory conditions any more than a hoe can produce potatoes.

A control chart is a tool. It is a means for differentiating between the random variations that must normally be expected and those that inject themselves at irregular intervals and which are due to some specific detectable cause. Those causes will not disappear simply as a result of being charted, but only if someone takes positive action to remove the cause. Therein lies the value of the control chart, first to point out when unwanted variations arise, and second, as appropriate controls and action are applied, the irregularities become fewer and fewer and the chart will then present the evidence of a stable uniform process.

Goodyear Speeds Production with Power Trucks

By R. F. CRAWFORD
Elwell-Parker Electric Co., Cleveland, Ohio

ELECTRIC power industrial trucks are used effectively for co-ordinating production operations at Goodyear Tire & Rubber Co.'s plants in Akron, Ohio. This company's experience is of timely interest because there is practically no delay due to lost motion in handling raw materials or finished products.

The company uses a fleet of trucks for speeding complex jobs, from unloading large quantities of heavy and bulky materials at railroad sidings, transporting them in or out of storage, step by step through processing departments, and to final shipment of finished goods.

It has been demonstrated that an efficient trucking system eliminates need for large storage facilities beyond normal inventories, as there are few interruptions to continuous flow of goods as scheduled. Over-all advantages are savings in manpower, time and money—the simplification of work that contributes importantly to fast and economical output. Electric trucks have virtually no "down time" and therefore do much to eliminate idle men and idle machines.

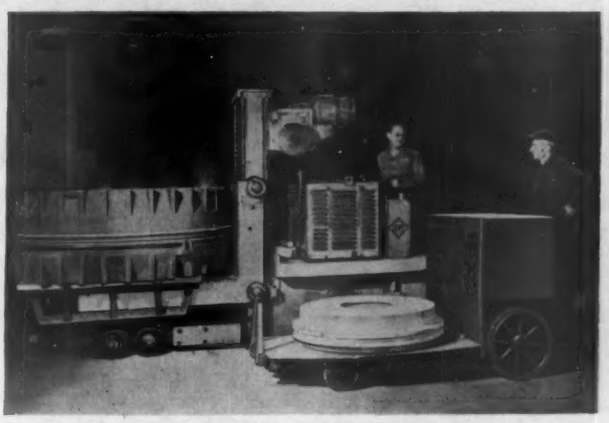
The company estimates conservatively one electric truck with operator does as much work as formerly required "two and a half hand trucks and five men." A higher ratio is noted for handling jobs in some departments.

A minimum amount of manual labor means less attendant supervision; prompt action in accomplishing what is to be done. Heavy repetitive jobs no longer depend on so-called "common labor," while employment in general has risen to all-time peaks. All available labor is employed to better purpose. Modern production could not be accomplished with labor forces proportionate to that which was required a decade or two ago.

Adding to its fleet of 34 Elwell-Parker trucks, Goodyear recently installed another unit, this being the latest type of high-lift platform truck. The platform is 32 inches wide, 60 inches long; lowered it is 11½ inches above floor level, and at maximum elevation is up 55 inches. The truck weighs 9,000 pounds, yet carries loads weighing 16,000 pounds or more. By way of contrast, the smaller Elwell-Parker in the accompanying illustration has been in continuous use by Goodyear since 1917.

Use of Elwell-Parker electric trucks at Goodyear dates back at least 31 years. Many have been in longer service with the company than the men who operate them. Some of the trucks are "older" than men who drive them. The first tractor-truck was retired in 1920 after having been driven over 100,000 miles by the same operator—transporting materials at this plant. The fleet now includes 26 lift platform trucks, five flat-bottom load carriers and four tractor type trucks.

Goodyear uses special skids in handling materials by platform trucks from supply rooms to tire building machines. Each skid contains materials carried in racks to provide the worker with a full supply for the manufacture of shift-quota of particular types of popular size tires. Trucks bring in all necessary materials and place them within arms-reach of the tire builders. Loaded trucks move from floor to floor by elevators, though they frequently travel up or down some ramps with 10 per cent grades.



The little Elwell-Parker truck in the foreground has been in continuous service at Goodyear's Akron plant since 1917. Towering over this machine is the latest model high-lift platform truck, with rated capacity of 16,000 lbs. Both industrial trucks are carrying tire molds, with the weight in each instance far exceeding that of the truck itself.

Not the least important advantage of electric power trucks is the fact they practically eliminate a fire hazard in working around combustible materials. More and more have been installed in accordance with engineering experience as regards dependability and safety.

Keep Out from Under Suspended Loads

THE two most serious accidents in a rubber plant last year were cases in which loads held by chain blocks fell, striking employees. In the one case, the chain became unhooked from the load when it was being turned over. An employee under the load was struck by it as it fell. In the second case, the chain again became unhooked and the load fell, hitting an employee who was out in the clear.

Both these accidents emphasize the necessity of keeping out from under loads suspended by hoists or chain blocks. Chains may become unhooked or equipment may break, allowing the loads to fall.

If it is necessary to work under equipment that has been elevated, wooden blocks should be used to support the load.

Every supervisor and foreman should survey his operations to see that in no case is it necessary to work under suspended equipment, large tires, etc.

All employees should be instructed and closely supervised to see that they do not take the chance of receiving a serious injury that may result from being crushed under a falling load.

Rubber Safety Letter

The Effect of Whole Tire Reclaimed Rubber on the Accelerated Aging of Natural Rubber and GR-S

By J. M. BALL and R. L. RANDALL

Midwest Rubber Reclaiming Co., East St. Louis, Ill.

CERTAIN specifications for various kinds of industrial rubber goods such as hose, packing and tubing require that a given percentage of the original tensile strength (or of both tensile and elongation) be retained after an aging period in the air oven or oxygen bomb. Inasmuch as reclaimed rubber is an important compounding ingredient for such rubber goods it is worth while to know what effect reclaim may have on the behavior of natural rubber and GR-S compounds during accelerated aging. The purpose of this paper, therefore, is to present results of laboratory work designed to throw some light on this subject.

Four commercial whole tire reclaims were used, designated as follows:

	RHC	*Process*
N-A	Natural	Alkali
N-N	Natural	Neutral
NS-N	Natural + GR-S	Neutral
S-N	GR-S	Neutral

The first two are pre-war reclaims, no longer available except in relatively small quantities. The third reclaim, NS-N, is the predominating type today. The analyses follow:

ANALYSES OF THE RECLAIMS

	N-A	N-N	NS-N	S-N
Specific Gravity	1.19	1.19	1.17	1.16
Acetone Extract	12%	11%	17%	24%
Chloroform Extract	1	1	1	1
Ash	17	16	10	8
Cellulose	2	None	None	None
Carbon Black	14	17	18	19
RHC (Difference)	52	55	52	46

Each of the four reclaims was used in two proportions with both natural rubber and GR-S as shown in Table I (for simplicity the rubber hydrocarbon content by weight of all the reclaims was taken as 50 per cent).

One per cent of the antioxidant, phenylbetanaphthylamine, on the rubber hydrocarbon content was used in all compounds. Inasmuch as the GR-S as received already contained approximately this same proportion of phenylbetanaphthylamine adjustments were accordingly made in the addition of this material to the reclaim compounds in the GR-S series.

A range of 5 cures was made in the press from 10 to 90 minutes at 287°F. and all cures were aged as follows:

Air oven, 100° C., 46 and 96 hours
Oxygen bomb, 70° C., 300 p.s.i., 46 and 96 hours

Note: This paper was presented before the Division of Rubber Chemistry, A.C.S., Detroit, Mich., November 9, 1948.

The complete data on test results are contained in a special appendix (available from the authors on request), but for convenience a tabular summary is given here containing averages of the results on three cures, viz., 30, 60 and 90 minutes. Twelve graphs illustrate the results (96 hour aging periods only). Oven is abbreviated "O" and oxygen bomb is abbreviated "B."

Summary of Results

Tensile Strength: In the air oven (Figs. 1 and 2) age resistance is greatly improved by the introduction of reclaimed rubber. The modern reclaim containing GR-S hydrocarbon is equal or superior to the pre-war natural rubber reclaims. The high reclaim compounds on the whole have better age resistance than the low reclaim compounds. The GR-S series ages better than the smoked sheet series.

In the oxygen bomb (Figs. 3 and 4) age resistance is not greatly affected by the introduction of reclaim except in the case of the high reclaim smoked sheet series where improvement results. Those compounds age better than the corresponding low reclaim compounds. Again the GR-S series ages better than the smoked sheet series.

Elongation: In the air oven (Figs. 5 and 6) aging on the whole is improved by the introduction of reclaim.

TABLE I—BASE COMPOUNDS

	Smoked Sheet Series			GR-S Series		
Smoked Sheet	100	80	50	—	—	—
GR-S	—	—	—	100	80	50
Reclaimed Rubber	—	40	100	—	40	100
Phenylbeta-naphthylamine	1	1	1	—	0.2	0.5
EPC Black	40	40	40	40	40	40
HMF Black	20	20	20	20	20	20
300 MR	20	20	20	20	20	20
Petrolatum	5	5	5	5	5	5
Stearic Acid	2	2	2	2	2	2
Zinc Oxide	5	5	5	5	5	5
Benzothiazyl Disulfide	1	1	1	1.5	1.5	1.5
DPG	0.3	0.3	0.3	0.4	0.4	0.4
Sulfur	3.5	3.5	3.5	2.5	2.5	2.5
	197.8	217.8	247.8	196.4	216.6	246.9
Specific Gravity*	1.15	1.18	1.22	1.15	1.18	1.22
Cost per Lb.†	$0.151	0.132	0.109	$0.133	0.119	0.103
Cost per Lb. Vol.	.174	.156	.133	.153	.140	.126

* Average values.

† Smoked sheet, 22½c; GR-S, 18½c; reclaim, 8½c.

TABULAR SUMMARY OF RESULTS

(Average of 30, 60, 90 Minute Cures)

SMOKED SHEET SERIES

Compd.	Tensile Orig.	Tensile Aged		Tensile % of Orig.	Elongation Orig.	Elongation Aged		Elongation % of Orig.	Hardness Orig.	Hardness Aged		Hardness Increase
					Smoked Sheet 100, Reclaim 0							
Control	2820	O—46	1635	58	575	O—46	295	51	65	O—46	73	8
		O—96	905	32		O—96	145	25		O—96	76	11
		B—46	2005	71		B—46	470	82		B—46	72	7
		B—96	1720	61		B—96	435	76		B—96	75	10
					Smoked Sheet 80, Reclaim 40							
N-A	2235	O—46	1385	62	455	O—46	210	46	73	O—46	80	7
		O—96	850	38		O—96	115	25		O—96	82	9
		B—46	1655	74		B—46	365	80		B—46	80	7
		B—96	1455	65		B—96	325	71		B—96	82	9
N-N	2220	O—46	1640	74	435	O—46	240	55	74	O—46	80	6
		O—96	1055	48		O—96	125	29		O—96	83	9
		B—46	1675	75		B—46	355	82		B—46	81	7
		B—96	1510	68		B—96	315	72		B—96	82	8
NS-N	2045	O—46	1390	68	425	O—46	195	46	76	O—46	81	5
		O—96	1075	53		O—96	145	34		O—96	82	6
		B—46	1515	74		B—46	340	80		B—46	84	8
		B—96	1345	66		B—96	315	74		B—96	84	8
S-N	2250	O—46	1665	74	435	O—46	240	55	75	O—46	81	6
		O—96	1405	63		O—96	180	41		O—96	81	6
		B—46	1665	74		B—46	340	78		B—46	81	6
		B—96	1445	64		B—96	305	70		B—96	83	8
					Smoked Sheet 50, Reclaim 100							
N-A	1730	O—46	1135	66	385	O—46	160	42	76	O—46	83	7
		O—96	850	49		O—96	90	23		O—96	84	8
		B—46	1345	78		B—46	300	78		B—46	81	5
		B—96	1085	63		B—96	240	62		B—96	86	10
N-N	1485	O—46	1035	70	290	O—46	115	40	78	O—46	85	7
		O—96	770	52		O—96	65	22		O—96	87	9
		B—46	1320	89		B—46	240	83		B—46	85	7
		B—96	1170	79		B—96	205	71		B—96	87	9
NS-N	1680	O—46	1305	78	325	O—46	130	40	78	O—46	85	7
		O—96	1195	71		O—96	105	32		O—96	87	9
		B—46	1420	85		B—46	270	83		B—46	81	3
		B—96	1250	74		B—96	225	69		B—96	85	7
S-N	1585	O—46	1240	78	290	O—46	115	40	80	O—46	87	7
		O—96	1215	77		O—96	100	34		O—96	87	7
		B—46	1410	89		B—46	245	84		B—46	83	3
		B—96	1265	80		B—96	210	72		B—96	85	5

GR-S SERIES

					GR-S 100, Reclaim 0							
Control	2150	O—46	1525	71	505	O—46	185	37	69	O—46	81	12
		O—96	1395	65		O—96	145	29		O—96	84	15
		B—46	2080	97		B—46	445	88		B—46	73	4
		B—96	1950	91		B—96	400	79		B—96	77	8
					GR-S 80, Reclaim 40							
N-A	1850	O—46	1625	88	400	O—46	215	54	75	O—46	85	10
		O—96	1675	90		O—96	190	48		O—96	86	11
		B—46	1790	97		B—46	390	98		B—46	79	4
		B—96	1725	93		B—96	365	91		B—96	80	5
N-N	1820	O—46	1655	91	375	O—46	195	52	78	O—46	84	6
		O—96	1655	91		O—96	155	41		O—96	88	10
		B—46	1765	97		B—46	345	92		B—46	80	2
		B—96	1680	92		B—96	330	88		B—96	80	2
NS-N	1775	O—46	1645	93	390	O—46	190	49	77	O—46	86	9
		O—96	1655	93		O—96	145	37		O—96	87	10
		B—46	1745	98		B—46	370	95		B—46	78	1
		B—96	1675	94		B—96	345	88		B—96	80	3
S-N	1685	O—46	1485	88	455	O—46	200	44	76	O—46	85	9
		O—96	1560	93		O—96	135	30		O—96	89	13
		B—46	1610	96		B—46	395	87		B—46	77	1
		B—96	1565	93		B—96	390	86		B—96	79	3
					GR-S 50, Reclaim 100							
N-A	1510	O—46	1480	98	365	O—46	200	55	78	O—46	85	7
		O—96	1370	91		O—96	145	40		O—96	88	10
		B—46	1420	94		B—46	330	91		B—46	80	2
		B—96	1225	81		B—96	305	84		B—96	81	3
N-N	1500	O—46	1455	97	325	O—46	155	48	79	O—46	88	9
		O—96	1515	101		O—96	115	35		O—96	89	10
		B—46	1410	94		B—46	295	91		B—46	80	1
		B—96	1365	91		B—96	285	88		B—96	81	2
NS-N	1490	O—46	1520	102	320	O—46	155	48	80	O—46	90	10
		O—96	1515	102		O—96	115	36		O—96	91	11
		B—46	1435	96		B—46	280	88		B—46	81	1
		B—96	1385	93		B—96	280	88		B—96	82	2
S-N	1340	O—46	1505	113	385	O—46	190	49	78	O—46	88	10
		O—96	1545	116		O—96	155	40		O—96	90	12
		B—46	1275	95		B—46	335	87		B—46	80	2
		B—96	1265	94		B—96	335	87		B—96	79	1

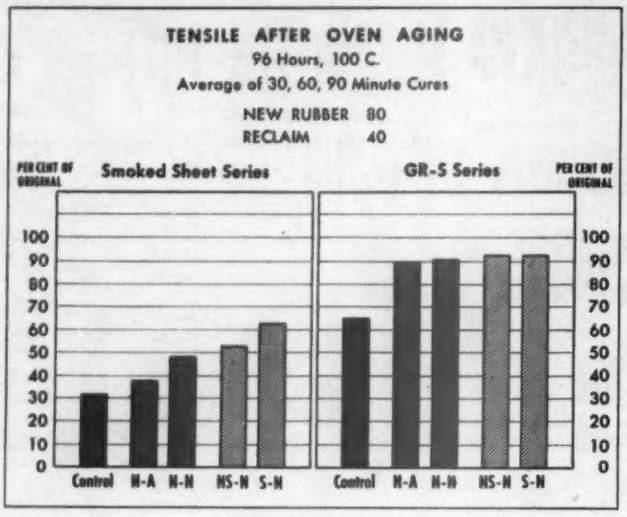

TENSILE AFTER OVEN AGING
96 Hours, 100 C.
Average of 30, 60, 90 Minute Cures
NEW RUBBER 80
RECLAIM 40
PER CENT OF ORIGINAL
Smoked Sheet Series
GR-S Series
PER CENT OF ORIGINAL
100 90 80 70 60 50 40 30 20 10 0
Control N-A N-N NS-N S-N
Control N-A N-N NS-N S-N

FIGURE 1

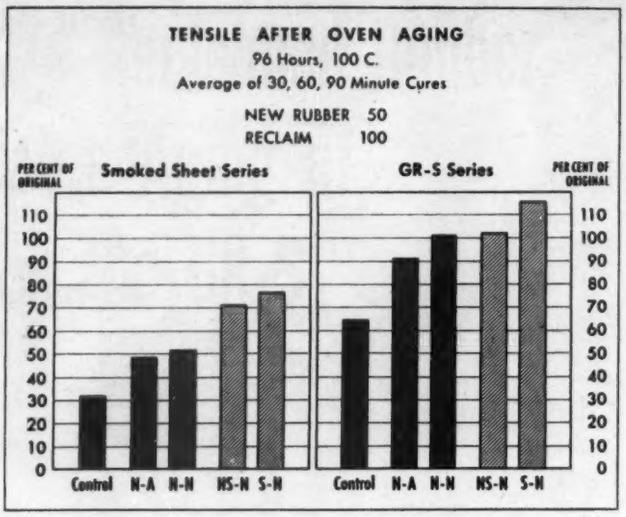

TENSILE AFTER OVEN AGING
96 Hours, 100 C.
Average of 30, 60, 90 Minute Cures
NEW RUBBER 50
RECLAIM 100
PER CENT OF ORIGINAL
Smoked Sheet Series
GR-S Series
PER CENT OF ORIGINAL
110 100 90 80 70 60 50 40 30 20 10 0
Control N-A N-N NS-N S-N
Control N-A N-N NS-N S-N

FIGURE 2

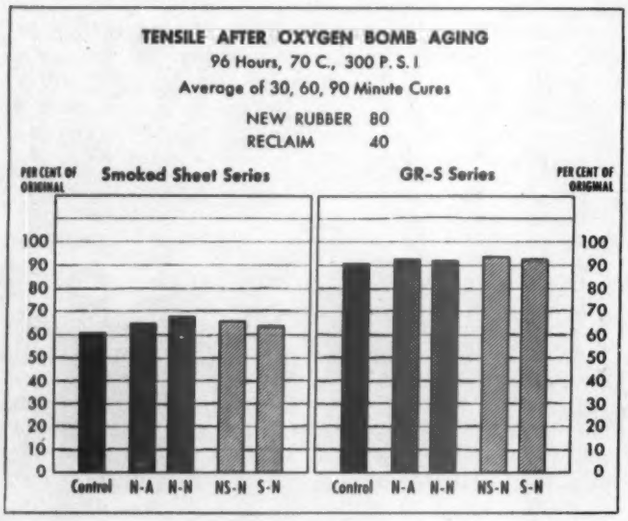

TENSILE AFTER OXYGEN BOMB AGING
96 Hours, 70 C., 300 P. S. I.
Average of 30, 60, 90 Minute Cures
NEW RUBBER 80
RECLAIM 40
PER CENT OF ORIGINAL
Smoked Sheet Series
GR-S Series
PER CENT OF ORIGINAL
100 90 80 70 60 50 40 30 20 10 0
Control N-A N-N NS-N S-N
Control N-A N-N NS-N S-N

FIGURE 3

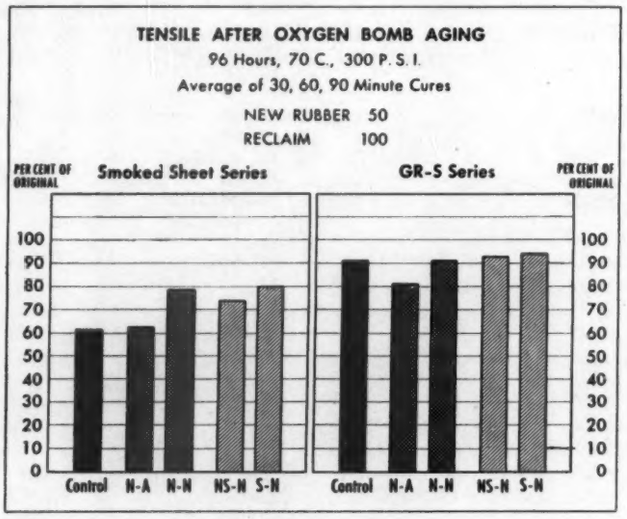

TENSILE AFTER OXYGEN BOMB AGING
96 Hours, 70 C., 300 P. S. I.
Average of 30, 60, 90 Minute Cures
NEW RUBBER 50
RECLAIM 100
PER CENT OF ORIGINAL
Smoked Sheet Series
GR-S Series
PER CENT OF ORIGINAL
100 90 80 70 60 50 40 30 20 10 0
Control N-A N-N NS-N S-N
Control N-A N-N NS-N S-N

FIGURE 4

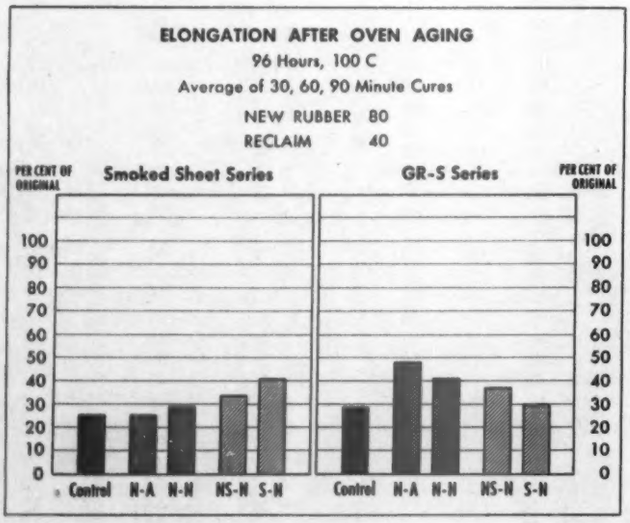

ELONGATION AFTER OVEN AGING
96 Hours, 100 C
Average of 30, 60, 90 Minute Cures
NEW RUBBER 80
RECLAIM 40
PER CENT OF ORIGINAL
Smoked Sheet Series
GR-S Series
PER CENT OF ORIGINAL
100 90 80 70 60 50 40 30 20 10 0
Control N-A N-N NS-N S-N
Control N-A N-N NS-N S-N

FIGURE 5

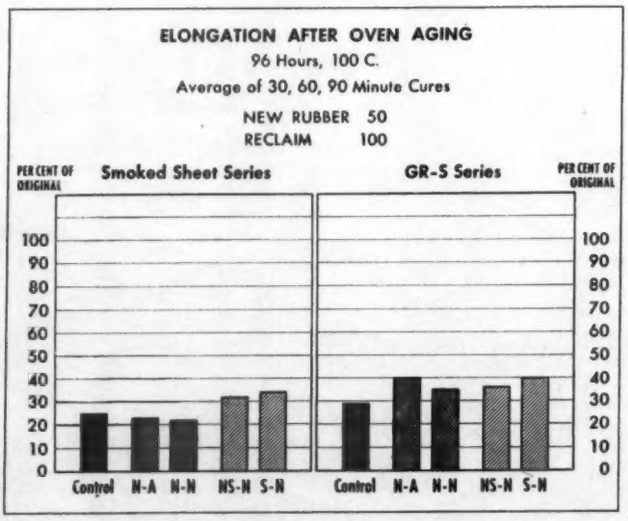

ELONGATION AFTER OVEN AGING
96 Hours, 100 C.
Average of 30, 60, 90 Minute Cures
NEW RUBBER 50
RECLAIM 100
PER CENT OF ORIGINAL
Smoked Sheet Series
GR-S Series
PER CENT OF ORIGINAL
100 90 80 70 60 50 40 30 20 10 0
Control N-A N-N NS-N S-N
Control N-A N-N NS-N S-N

FIGURE 6

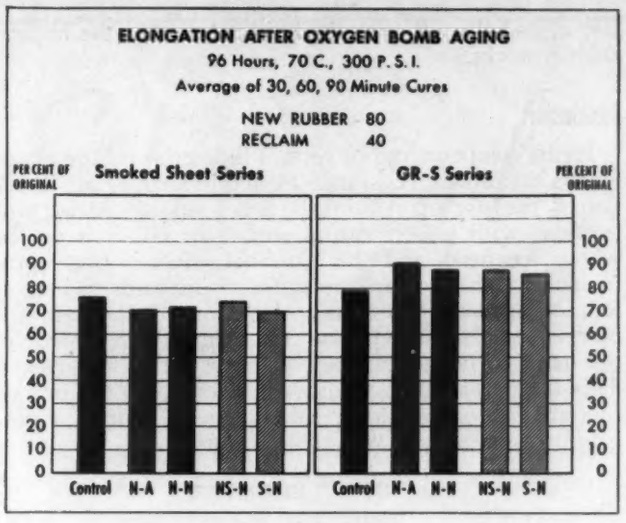

ELONGATION AFTER OXYGEN BOMB AGING
96 Hours, 70 C., 300 P. S. I.
Average of 30, 60, 90 Minute Cures
NEW RUBBER 80
RECLAIM 40
PER CENT OF ORIGINAL
Smoked Sheet Series
GR-S Series
PER CENT OF ORIGINAL
100 90 80 70 60 50 40 30 20 10 0
Control N-A N-N NS-N S-N
Control N-A N-N NS-N S-N

FIGURE 7

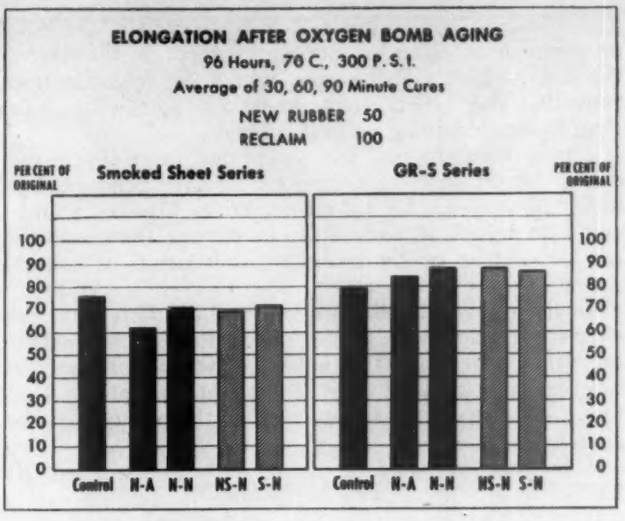

ELONGATION AFTER OXYGEN BOMB AGING
96 Hours, 70 C., 300 P. S. I.
Average of 30, 60, 90 Minute Cures
NEW RUBBER 50
RECLAIM 100
PER CENT OF ORIGINAL
Smoked Sheet Series
GR-S Series
PER CENT OF ORIGINAL
100 90 80 70 60 50 40 30 20 10 0
Control N-A N-N NS-N S-N
Control N-A N-N NS-N S-N

FIGURE 8

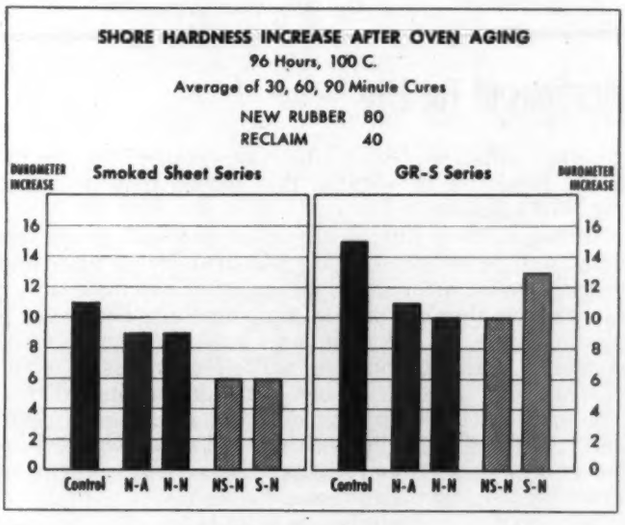

SHORE HARDNESS INCREASE AFTER OVEN AGING
96 Hours, 100 C.
Average of 30, 60, 90 Minute Cures
NEW RUBBER 80
RECLAIM 40
DUROMETER INCREASE
Smoked Sheet Series
GR-S Series
DUROMETER INCREASE
16 14 12 10 8 6 4 2 0
Control N-A N-N NS-N S-N
Control N-A N-N NS-N S-N

FIGURE 9

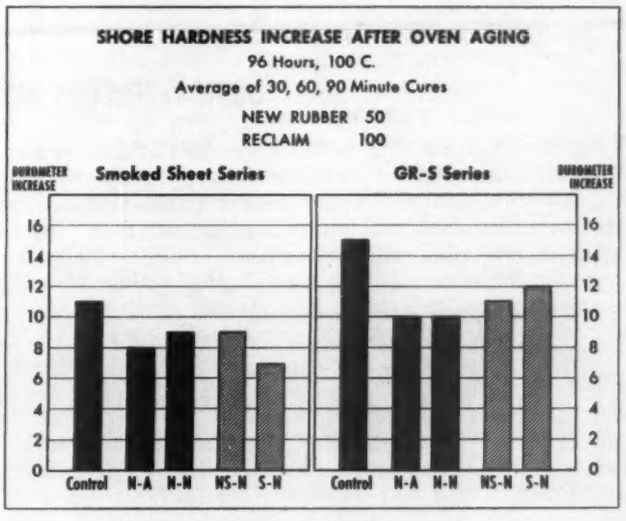

SHORE HARDNESS INCREASE AFTER OVEN AGING
96 Hours, 100 C.
Average of 30, 60, 90 Minute Cures
NEW RUBBER 50
RECLAIM 100
DUROMETER INCREASE
Smoked Sheet Series
GR-S Series
DUROMETER INCREASE
16 14 12 10 8 6 4 2 0
Control N-A N-N NS-N S-N
Control N-A N-N NS-N S-N

FIGURE 10

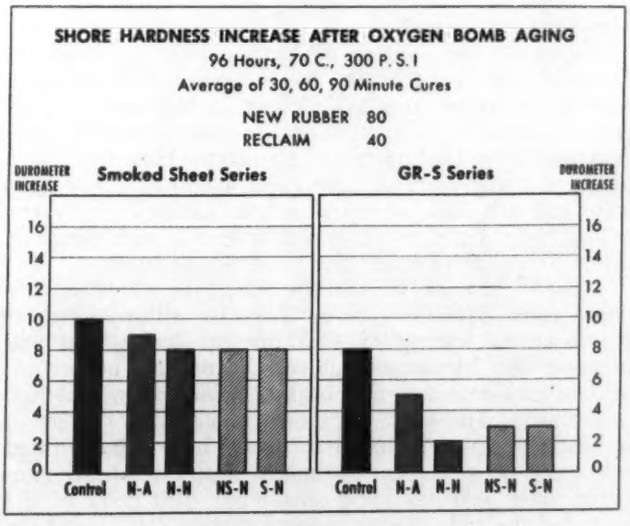

SHORE HARDNESS INCREASE AFTER OXYGEN BOMB AGING
96 Hours, 70 C., 300 P. S. I
Average of 30, 60, 90 Minute Cures
NEW RUBBER 80
RECLAIM 40
DUROMETER INCREASE
Smoked Sheet Series
GR-S Series
DUROMETER INCREASE
16 14 12 10 8 6 4 2 0
Control N-A N-N NS-N S-N
Control N-A N-N NS-N S-N

FIGURE 11

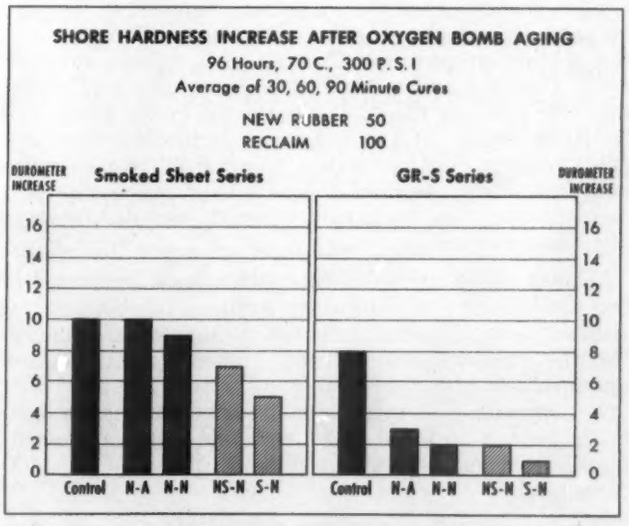

SHORE HARDNESS INCREASE AFTER OXYGEN BOMB AGING
96 Hours, 70 C., 300 P. S. I
Average of 30, 60, 90 Minute Cures
NEW RUBBER 50
RECLAIM 100
DUROMETER INCREASE
Smoked Sheet Series
GR-S Series
DUROMETER INCREASE
16 14 12 10 8 6 4 2 0
Control N-A N-N NS-N S-N
Control N-A N-N NS-N S-N

FIGURE 12

The reclaims containing GR-S hydrocarbon are equal or superior to those of pre-war, except in the case of the low reclaim GR-S series, where the opposite trend prevails. The GR-S compounds age somewhat better than those containing natural rubber.

This oven aging test is a severe one, more severe than called for in such specifications as have been referred to in this paper. All values shown in Figures 5 and 6 could be raised, if desired, by increasing the proportion of antioxidant or by using a combination of antioxidants.

In the oxygen bomb (Figs. 7 and 8) there is a measurable but not pronounced effect due to the presence of reclaimed rubber. With GR-S the effect is positive, whereas with smoked sheet it is slightly negative. Again the GR-S stocks age better than the natural rubber stocks.

Hardness Increase: In the air oven (Figs. 9 and 10) hardening of the reclaim compounds is appreciably less than that of the controls. The modern reclaim gives an excellent account of itself. The GR-S compounds show greater hardening than those containing smoked sheet.

In the oxygen bomb (Figs. 11 and 12) the beneficial effect of reclaim is strikingly evident, especially with GR-S, and the GR-S stocks harden less than the natural rubber stocks.

Conclusion

In the compounding of certain industrial rubber goods where maximum resistance to accelerated aging is required the use of reclaimed rubber in substantial proportions with either natural rubber or GR-S is on the whole beneficial, and the beneficial effect is often pronounced. A high proportion of reclaim tends to be better for age resistance than a low proportion, and the modern whole tire reclaims containing GR-S hydrocarbon tend to be better than their pre-war counterparts. This improvement in aging is in addition to the unique contribution of reclaimed rubber toward better processing properties and lower volume costs.

ACKNOWLEDGMENT

The authors are indebted to Mr. W. A. Wake, Technical Director, Whitehead Brothers Rubber Company, Trenton, N. J., for information which led to this work, and for having carefully reviewed the manuscript and data.

Some Properties and Applications of Tuf-Lite

THE development and introduction of Tuf-Lite, a new material secured by blending a large proportion of high styrene copolymer and a smaller quantity of natural or synthetic rubber, was announced in one of our recent issues. Some additional data on properties and applications of the material have since been furnished by the Goodyear Tire & Rubber Co., Akron, Ohio, manufacturers of Tuf-Lite, which is presented below:

Tuf-Lite embodies a completely new and different approach to the art of combining basically unlike materials to obtain one compound having the most desirable properties of its constituents. Heretofore, small quantities of hard, brittle resins have been added to rubbers to harden, stiffen and toughen the stocks. In Tuf-Lite, the reverse is applied with low proportions of the various natural and synthetic rubbers being used to plasticize high styrene copolymer resins. The resultant blends are tough, light, highly impact resistant stocks to which the generic name, Tuf-Lite, has been assigned.

The properties of Tuf-Lite are somewhat variable and are dependent upon the particular combination and the specific proportion of resins and rubbers that are used. The type and method of compounding and curing will also have an effect. However, the entire group can be characterized by the following properties: high impact resistance, low water absorption, easily compounded, wide range of colors obtainable, easily post formed, good working characteristics, and flexibility in physical properties.

Almost all of the common rubbers have been used in the manufacture of Tuf-Lite, with the best impact resistance being secured with GR-S, the butadiene-acrylonitrile rubbers, and natural rubber; neoprene and butyl rubber give stocks of good tensile but somewhat lower impact. The proportion of copolymer resin normally used is 60 to 90 parts, with one of the aforementioned rubbers making up the remainder of the 100 parts total.

The resin-rubber mixtures comprising the new material can be easily prepared using conventional rubber mixing equipment. With either an open mill or an internal mixer, it is essential that the equipment be hot for good blending.

In addition to the variation in physical properties which can be obtained by the use of different types and proportions of resins and rubbers, other specific qualities are possible through proper compounding. The thermoplastic nature of the resin used and the rubber component of Tuf-Lite mixtures make for successful modification with common rubber compounding ingredients. The usual curing agents, accelerators, coloring pigments and fillers can be readily incorporated on a two-roll rubber mill or in a Banbury mixer immediately subsequent to the blending of the rubber and resin.

When using a Banbury it usually is advisable to postpone the addition of curing agents until the stock is on the "batch-off" mill as the heat generated in blending might cause "scorching." Another recommended procedure is to mix resin and rubber on a two roll mill, put the hot batch in a cool Banbury and then add the compounding ingredients.

Generally, the addition of loading pigments tends to decrease tensile strength, to increase hardness only slightly, to have a negligible effect on elongation, to increase compressive strength and to maintain good abrasion when the loading is not too great. However, none of these changes are of very great magnitude. The light color and non-staining characteristics of the high styrene resins make Tuf-Lite easily available in a wide range of colors when non-discoloring rubbers are used.

Tuf-Lite can be utilized in either the cured or uncured form. However, cured Tuf-Lite will give greater resistance to tearing or breaking on flexing and will increase the hardness slightly. Curing can be accomplished in sheet form in a heating device or by molding.

Uncured Tuf-Lite has been successfully injection molded; however, the resultant pieces have demonstrated relatively poor flexural strength. Tuf-Lite in the uncured state also has been calendered with good results provided the rolls are hot, approximately 250°F, and the gauge of the sheet is less than 3/32".

Editorials . . . . . .

International Conference

ELEVEN years ago, in 1938, the Institution of the Rubber Industry, in cooperation with other technical organizations in England, sponsored the first Rubber Technology Conference and decided to hold similar meetings every five years. The first Conference, international in character, was held in London and was attended by over 550 delegates with 103 papers presented. The second Conference was scheduled for 1943, but the war interfered and it was postponed until last year (maintaining the five year cycle). Held in London last June, this second conference attracted over 600 delegates and featured 43 papers.

As we have stated in the past, the international conferences sponsored by the I.R.I. well merit the support given to them. Not only are technical developments revealed in the papers presented, but full opportunity for discussion, criticism, suggestion and counsel is provided. Moreover, the opportunity for leading technologists on both sides of the Atlantic to get together, to visit local rubber factories and laboratories, and to check mutual progress on specific problems is priceless. The conferences run the full gamut of rubber technology, not only from the theoretical but from the practical side as well.

We admire the spirit and effort expended by the British rubber organizations, particularly the Institution of the Rubber Industry, to make these technological conferences as successful as the first two have been. But why confine them to London? Why confine them to a five-year cycle only? Technological developments recognize no specific time limits. Progress is recorded in almost every month of the year. There undoubtedly would be sufficient interest in more frequent international conferences. And certainly a conference of this scope held within the United States, which has the largest rubber manufacturing industry of any country and which accounts for more than half of world rubber consumption, would attract a far larger attendance than those achieved by the conferences held to date in London.

For these reasons, among others, we propose that an International Rubber Technology Conference be held in the United States, not to compete with the five-year conferences held in London, but rather to augment those meetings. For example, a conference held in this country in late 1950 or early 1951 would not clash with the next I.R.I. Conference to be held in London in 1953. The American meeting might be held on a one-time trial basis, and if successful it could be set up as a regular affair timed to supplement and not conflict with the British meeting.

One of the outstanding reasons for the success of the I.R.I. conferences is the fact that papers are presented which appeal to practically every branch of the rubber industry and to almost every member of that industry —to the chemist, the technologist, the engineer, the compounder, the maintenance man, etc. Although held under the auspices of the I.R.I., complete cooperation is received from other leading British rubber organizations. Accordingly, we suggest that any American conference be sponsored jointly by the three leading rubber technical groups in this country, i.e., the Division of Rubber Chemistry of the American Chemical Society, Committee D-11 on Rubber of the American Society for Testing Materials, and the Rubber & Plastics Division of the American Society of Mechanical Engineers.

Details concerned with the handling of an international conference are numerous, but should the proposed conference be held in late 1950 or early 1951 there would be sufficient time to organize it efficiently. Each of the suggested American rubber organizations could name one or more delegates to a central committee which would be charged with the organizational work. Undoubtedly, excellent cooperation could be secured from the I.R.I. Furthermore, the Central Committee for Improving Lectures and Publications, headed by Dr. Houwink in Delft, Holland, has drawn up a number of suggestions for consideration by groups when organizing scientific or technical congresses on an international scale.

There are many more angles concerned with the organizing of an international conference. For example, the problem of location. For an international conference of the type proposed, which would probably attract an attendance of 1500 or more, Atlantic City, with its tremendous auditorium and numerous hotels, would probably be the best location. If the British practice were followed of issuing all of the papers presented in book form, the value of the conference would be considerably enhanced.

We have suggested the three American rubber organizations who might jointly sponsor an international conference, and we respectfully submit the proposal to their respective executive committees. We do not suggest that other American organizations be excluded. We feel sure, for example, that the Rubber Manufacturers Association would like to occupy a sponsoring role of some kind in any international rubber conference. Room could be provided for any such organizations desiring to cooperate in helping to make such a conference successful.

CURRENT NEWS OF THE MONTH

URWA TO SEEK FOURTH ROUND WAGE RAISE, HEALTH BENEFITS

L. S. Buckmaster, president of the United Rubber Workers of America, CIO, recently asked for and received approval from the union's policy committee for a 1949 bargaining program covering a fourth-round of wage increases, pensions, health and sickness insurance and a guaranteed annual wage. The cost to industry of such a program covering approximately 180,000 workers was not estimated. Some delegates among the 164 from the United States and Canada attending the Cleveland, Ohio, meeting said that it would amount to the equivalent of a straight wage increase of 30 cents an hour.

The union president said that the "big four" rubber companies, Goodrich, Goodyear, U. S. Rubber and Firestone, could well afford to meet the demands he outlined as being necessary to "restore any losses which our people have suffered in their living standards and to raise those standards to a new higher level." Mr. Buckmaster said that the "big four" had collected profits, after taxes, of more than $100,000,000 last year. These, he said, were about 120% more than the 1940 level, "which was a peacetime high."

Regarding pensions, Mr. Buckmaster said that the union did not expect organized labor to be apart from the rest of the nation. Full political strength will be brought to bear upon Congress and state legislatures for the enactment of adequate social security plans, he said. The health and welfare program would include fifty-two weeks of sickness and accident benefits at $25 a week, $7 a day hospitalization for as many as 120 days, surgical benefits up to $200, and still other advantages.

Mr. Buckmaster admitted that the union might not achieve its objective of a guaranteed annual wage at once, but he believed that a start should be made in that direction where contracts permit. Besides the wage and pension demands, the international policy committee recommended that all union officers strive to make the the six-hour day standard throughout the industry.

The only "big four" contract to be negotiated this year is that with Goodrich, beginning May 23. The contracts with the other three are reopenable in June or July for wage discussions by mutual consent, running otherwise until 1950.

First Industry Reactions

While the rubber companies were officially silent on the URW demands, some officials noted that the projected increase, "is impossible because it would mean higher prices." The public, they said, would not stand for higher prices in the competitive market already underway in the industry.

"By simple arithmetic," an official noted, "it's obvious that such an increase can't come out of earnings without disrupting the rubber companies' financial position. For some companies it definitely could not come out of last year's earnings while for others it would mean a great strain and leave nothing for reinvestment or for dividends."

Some believe, however, that negotiations may see the union reducing its demands in view of declining employment and a drop in the cost of living. One source, pointing out that the rubber workers are already among the highest paid hourly workers in the country, believes that when negotiations get under way the welfare program will become the primary objective of the union.

Rubber Deck for Planes

The British Navy is experimenting with a flexible aircraft carrier landing deck made of a rubber material that will enable carrier-borne aircraft to dispense with the undercarriage. In tests described as very successful, a Navy jet fighter was catapulted from a carrier and landed on the flexible deck on its skid. The carrier *Warrior* has been fitted with the new deck and further trials are being made with a modified De-Havilland jet fighter. If the new deck is adopted, improved performance resulting from elimination of any undercarriage would make carrier-borne jet fighters a match for any known aircraft.

Report on Transportation Goods

According to the Department of Commerce, new rubber going into transportation items during 1948 totaled 746,230 tons, 10.2% below the 1947 level. Consumption in other products, however, increased to 327,511 tons, 12.3% above the 1947 use. Manufacture of non-transport goods in 1948 consumed 30.5% of all new rubber used during the year against 26% in 1947. Figures compiled by the Rubber Division of the Office of Domestic Commerce show that the proportionate use of natural rubber to total new rubber consumption in the manufacture of transportation goods increased in 1948 over 1947. Consumption ratios of reclaim, neoprene and N-type synthetics also increased, while those of GR-S and butyl declined. In non-transport goods, consumption ratios of natural, butyl and N-type rubber increased, while those of the other synthetics declined.

AIEE PLANS APRIL CONFERENCE FOR RUBBER-PLASTICS INDUSTRY

The American Institute of Electrical Engineers has scheduled a second conference on electrical engineering problems in the rubber and plastics industries to be held on April 26 at the Hotel Portage, Akron, Ohio. The meeting will be sponsored by the subcommittee on rubber and plastic industries of the AIEE general applications committee, together with the AIEE Akron Section.

Advance copies of original papers to be presented at the conference are not available. However, all of the papers will be published together in a booklet after the conference. Prices for the booklet will be $1.50 to AIEE members and $3.00 for non-members. Advance registration cards, and orders for the 1949 conference papers, may be obtained from J. R. Dorsey, Young Men's Christian Association, Akron, Ohio. Checks should be made payable to the AIEE Akron Section.

Copies of the booklet covering the first conference held in 1948 are still available. These may be obtained from the AIEE Order Department, 33 West 39th St., New York 18, N. Y., at the same prices established for the 1949 booklet.

The following papers will be presented at the 1949 conference:

Motor Requirements for Rubber Mill Drives, by R. S. Ferguson, Goodyear Tire & Rubber Co., Akron, Ohio.

Motor Drives for Banbury Mixers, by C. F. Schnuck, Farrel-Birmingham Co., Ansonia, Conn.

The Application of Electric Motor Drives to Rubber Mills, by W. S. Watkins, Ohio Rubber Co., Willoughby, Ohio.

Motor Drives for Calenders, by V. O. Johnson, U. S. Rubber Co., New York, N. Y.

Motor Requirements for Tuber Drives, by D. J. Rose, Firestone Tire & Rubber Co., Akron, Ohio.

History of Joint Industry Conference Electrical Standards for Industrial Equipment, by L. A. Danse, General Motors Corp., Detroit, Mich.

Joint Industry Conference Electrical Standards for Industrial Equipment as Viewed by a Rubber Machinery Manufacturer, by T. C. Jones, National Rubber Machinery Co., Akron, Ohio.

Joint Industry Conference Standards for Industrial Equipment-User's Viewpoint, by L. J. Willmott, Willmott Electrical Co., Akron, Ohio.

Joint Industry Conference Standards for Industrial Equipment-User's Viewpoint, by F. L. Swanson, U. S. Rubber Co., Detroit, Mich.

Preventive Maintenance of Rotating Equipment in a Rubber Plant, by T. F. Duffy, U. S. Rubber Co., New York.

HIGH POLYMER FORUM FEATURES 115TH NATIONAL ACS MEETING

A high polymer forum will again feature the 115th national meeting of the American Chemical Society to be held in San Francisco, Calif., March 27 to April 1. The forum, sponsored jointly by the Cellulose, Colloid, Organic, Paint, Varnish and Plastics, Physical and Inorganic, and Rubber Chemistry Divisions, will be held on Monday, March 28.

Divided into two sessions, the morning session of the high polymer forum will be presided over by John Rehner, Jr., of the Standard Oil Development Co. W. J. Sparks, also of the Standard Oil Development Co., will preside over the afternoon session. The following papers will be presented at the forum:

On the Concentration Dependence of the Rates of Diffusion of Macromolecules in Solution: An Investigation of Fractions of Polystyrene, by A. F. Schick and S. J. Singer.

Properties of Polymer Molecules in Dilute Solution, by Bruno H. Zimm.

Transmission and Attenuation of Sound Waves in High Polymers, by B. A. Mrowca, D. G. Ivey, R. S. Witte, M. J. Forster, R. L. Anthony, and E. Guth.

Dynamic Mechanics of Polymer Molecules, by W. O. Baker, W. P. Mason, and J. H. Heiss.

The Nature of Carbon Black Surfaces, by W. D. Schaeffer, M. H. Polley, and W. R. Smith.

The Application of Partition Chromatography to the Fractionation of Nitrocellulose with Respect to Molecular Weight, by Marvin C. Brooks and Richard M. Badger.

Studies of the Interaction between Nitrocellulose and Plasticizers by Means of Light Scattering, by Robert H. Blaker and Richard M. Badger.

Thermodynamic Study of Polystyrene Solutions over the Osmotic Concentration Range, by Martin J. Schick, Paul M. Doty, and Bruno H. Zimm.

Punched Card Methods in Statistical Mechanics of High Polymers, by Gilbert W. King.

The Flow Properties of Plastics, by Stephen A. Rossmassler and Henry Eyring.

Low Temperature Autoxidation of Hydrocarbons: Part I, by Arthur V. Tobolsky, Donald J. Metz, and Robert B. Mesrobian.

Low Temperature Autoxidation of Hydrocarbons: Part II. The Scission Reaction, by Arthur V. Tobolsky, Donald J. Metz, and Robert B. Mesrobian.

Formulation Studies of Vinyl Resin Organosols, by G. M. Powell, R. W. Quarles, C. I. Spessard, and T. E. Mullen.

Monomer Reactivity Factors for Methyl Vinyl Sulfide and Sulfone, by Charles C. Price and Jack Zomlefer.

The Mechanism of Emulsion Polymerization, by W. P. Hohenstein.

Dechlorination of Vinyl Chloride Copolymers by Zinc, by Turner Alfrey, Jr., and Howard Haas.

Intramolecular Condensations in Vinyl Acetate-Crotonic Acid Copolymers, by Turner Alfrey, Jr., Charles Lewis, and Bernard Magel.

Vinylite Resin Floor Enamel

The Benjamin Foster Co., 4635 Girard Avenue, Philadelphia 31, Penna., has developed a new floor enamel for use on all wood, concrete and metal floors. The enamel is baked on vinylite resins and is said to withstand at least twice as much dry abrasion and ten times as much scrubbing with alkali solutions as floor enamels having any other base. The product is also said to be unaffected by water, grease, oils, brine alcohols, petroleum solvents, soaps, all alkalies, and most acids. The coating is applied by brush or spray and is available in a choice of attractive colors.

Terry Machinery Co. Formed

C. R. Terry, associated with the Hydraulic Press Manufacturing Co. for 11 years as a sales engineer, has formed the Terry Machinery Co., with offices in the Hanna Building, Cleveland, Ohio, as a sales agency for metal working machinery. Mr. Terry was at one time a buyer of machinery for the B. F. Goodrich Co. During the early stages of the last war, while on leave of absence from Hydraulic Press, Mr. Terry organized the Ohio OPM offices, the forerunner of the War Production Board, and served as Cleveland manager and state director.

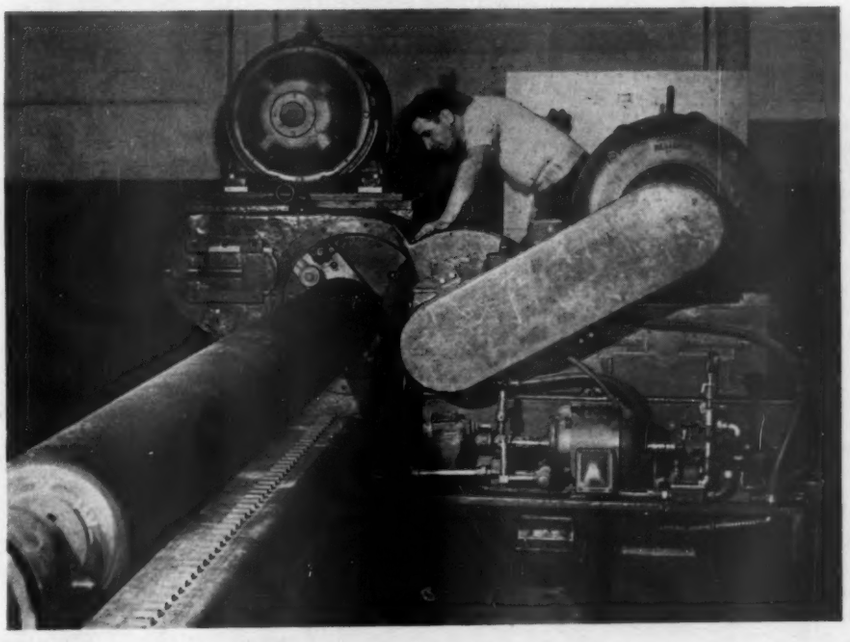
National Lead Names Collins

The National Lead Co., New York, N. Y., has appointed J Gordon Collins to direct sales of new products developed by its pigment division. In this capacity, Mr. Collins will operate from the New York office, and will maintain liaison with the new products development department, the research laboratories and all sales personnel. Prior to joining the National Lead organization, Mr. Collins was sales manager of the Michigan Chemical Corp., and had formerly been associated with the U. S. Rubber Co. for 14 years. His last eight years with U. S. Rubber were as sales manager of the chemical division.

Bakelite Cuts Vinylite Price

The price for all standard widths of .004 gauge Vinylite film, in both clear and color compounds, has been reduced 4 cents per pound by the Bakelite Corp., a unit of National Carbide and Carbon Corp. The reduction from 69 cents per pound to 65 cents per pound in car load lots was made possible by increased production capacity in the new film plant at Ottawa, Ill. New production methods and consequent increase in volume of sales also contributed to the price cut, Bakelite officials said.

GOODYEAR INSTALLS HUGE RUBBER-COVERED ROLL GRINDER AT AKRON



Installation of a huge rubber-covered roll grinder and other new equipment in a recently completed building has greatly increased the production capacity of the Goodyear Tire and Rubber Company's industrial roll covering department in Akron, Ohio, according to company officials. The move was made to meet demand of steel, textile and paper industries for prompt delivery on re-covering of industrial rolls pulled out of machines in production lines.

Of the latest type, the new roll grinder is designed to grind straight rolls, with catenary crown, or concave rolls. The huge size of the machine required a special foundation. Company engineers set the machine on nearly 100 tons of concrete in a deep excavation. No part of the machine or its foundation comes in contact with the floor of the building. The base for the machine literally floats in a bed of slag. This type foundation prevents vibrations and permits minute perfection in grinding the roll surface.

PLANS PROGRESSING RAPIDLY FOR RUBBER DIVISION MEETING

Plans for the 54th meeting of the Division of Rubber Chemistry, which, as previously announced, will be held in Boston, Mass., on May 23rd to 25th, are progressing rapidly. The first session is scheduled to start at 2:00 P.M. on Monday, May 23. Headquarters will be the Hotel Statler.

James C. Walton, of the Boston Woven Hose & Rubber Co., is chairman of the Local Arrangements Committee, which is planning several interesting innovations for the meeting. These include an old-fashioned clam bake at a nearby seashore resort on the evening of May 23 and visits to various manufacturing plants in Greater Boston on Tuesday afternoon, May 24.

The 25-Year Club will hold a luncheon on Monday, May 23. John M. Bierer, of the Boston Woven Hose & Rubber Co., one of the pioneers of the rubber manufacturing field, will act as chairman. Mr. Bierer is planning several innovations of his own, and a large attendance is anticipated at the luncheon. In order that all may be accommodated, it is suggested that those planning to attend the luncheon inform either Mr. Bierer or Charles W. Haynes, secretary of the Division, of such intention.

A Suppliers' Cocktail Party, under the chairmanship of Owen J. Brown, Jr., of Godfrey L. Cabot, Inc., will be held on Tuesday, May 24, preceding the usual divisional banquet. These cooperative parties have proved most successful in the past. The banquet will be held at 7:00 P.M. Special activities are also being scheduled for ladies visiting Boston with members and they will be welcome at the banquet. This, too, is an innovation for the division.

In addition to the usual broad range of subjects to be discussed during the technical sessions, the Committee on Papers is giving particular emphasis to developments in the low temperature polymer field and is planning a symposium at one of the sessions on this subject, providing sufficient papers can be secured. Another highlight of the meeting will be the Charles Goodyear Lecture to be delivered by Dr. Harry L. Fisher of U. S. Industrial Chemicals, Inc.

Special cards for hotel reservations have already been supplied to all division members. Division officials urge that such reservations be made as early as possible because of the large turn-out expected.

Farrel-Birmingham Names Blank

Farrel-Birmingham, Inc., Ansonia, Conn., has appointed M. H. Blank as representative in the Detroit, Mich., area to handle the sale of gears and gear units manufactured at the company's Buffalo, N. Y., plant. Mr. Blank, whose offices are located at 901 Lafayette Building, Detroit 26, has been engaged in sales engineering activities as manufacturers' agent in and around Detroit for the past few years.

Coming Events

Mar. 21-23. N.A.W.M.D., Annual Meeting, Stevens Hotel, Chicago, Ill.

Mar. 25. Boston Rubber Group, Somerset Hotel, Boston, Mass

Mar. 25. N. Y. Rubber Group, Henry Hudson Hotel, New York City.

Mar. 25. Chicago Rubber Group, Morrison Hotel, Chicago, Ill.

Mar. 27-Apr. 1. American Chemical Society, 115th National Meeting, San Francisco, Calif.

Apr. 15. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Apr. 21. R. I. Rubber Club, Metacomet Golf Club, East Providence, R. I.

May 6. Detroit Rubber Group, Detroit-Leland Hotel, Detroit, Mich.

May 20. Chicago Rubber Group, Morrison Hotel, Chicago, Ill.

May 21. Southern Ohio Rubber Group. (Tentative).

May 23-25. Rubber Division, A. C. S., Statler Hotel, Boston, Mass.

June 17. Akron Rubber Group, Outing.

June 24. Detroit Rubber Group, Outing, Golf Tournament.

June 27-July 1. A.S.T.M., 52nd Annual Meeting, Chalfont-Haddon Hall, Atlantic City, N. J.

Sept. 18-23. American Chemical Society, 116th National Meeting, Atlantic City, N. J.

Sept. 22. Southern Ohio Rubber Group. (Tentative).

Oct. 7. Detroit Rubber Group, Detroit-Leland Hotel, Detroit, Mich.

Oct. 10-14. A.S.T.M., West Coast Meeting, Fairmont Hotel, San Francisco, Calif.

Oct. 14. Boston Rubber Group, Somerset Hotel, Boston, Mass.

Oct. 21. N. Y. Rubber Group, Henry Hudson Hotel, New York City.

Dec. 9. Detroit Rubber Group, Detroit-Leland Hotel, Detroit, Mich.

Dec. 10. Southern Ohio Rubber Group. (Tentative).

Dec. 16. N. Y. Rubber Group, Henry Hudson Hotel. New York City.

Dec. 16. Boston Rubber Group, Somerset Hotel, Boston, Mass.

Enjay Adopts Paracril Name

Enjay Co., Inc., New York, has adopted the name of "Paracril" for the nitrile rubbers formerly sold by the company under the name of Perbunan. The new name ties in with the company's family of "para" chemicals made from petroleum. Four grades of Paracril are currently available, namely Paracril 18-80, 26NS60, 26NS90, and 35NS90. The company has also adopted a new color code system for identifying the various grades of Paracril available. Green covers Paracril 18-80, blue for 26NS60, yellow for 26NS90, and red for 35NS90. Copies of the color code chart, suitable for posting in the factory, are available from the company on request.

TETRAETHYL THIURAM DISULFIDE POSSIBLE CURE FOR ALCOHOLICS

According to medical data recently made available, some factory workers have developed an intolerance for alcoholic drinks after exposure to fumes containing tetraethyl thiuram disulfide, better known in the rubber field as Ethyl Tuads. However, a new physicians' committee on alcoholism issued a warning on February 20 against public acceptance of the theory for the time being.

The new committee is the Organization Committee for Research on Medical Treatment of Alcoholic Patients, with headquarters at 143 East 39th St., in New York City, and headed by Dr. Edwin G. Zabriskie as chairman. Dr. Zabriskie is Professor Emeritus of Clinical Neurology at Columbia University College of Physicians and Surgeons.

According to Dr. Zabriskie, tetraethyl thiuram disulfide is currently being used in Denmark and Sweden for the treatment of alcoholics. He said that for some time it has been known that this compound will cause an intolerance for alcohol. About two years ago employees of one of the Akron rubber plants were exposed to air containing the drug in powdered form and these employees subsequently developed an intolerance for alcohol which made it impossible for them to drink any alcoholic beverage without experiencing nausea and other unpleasant symptoms. He added that it was not known how long this condition existed.

The Akron observation led to an investigation of the toxicity of tetraethyl thiuram disulfide and other dithiocarbamic acid derivatives, this research being supervised by Dr. H. Brieger of the Jefferson Medical College at Philadelphia, Penna. Dr. Brieger's report, according to Dr. Zabriskie, clearly indicates further investigation of the tetraethyl compound before the medical field knows whether it is safe to use the drug in the treatment of alcoholics.

According to the Danish reports, the drug is effective but its medical use must be followed by intensive psychotherapy to rebuild the patient socially.

Canadian Rubber Conference Set

Two regional conferences on rubber and high polymers to be run concurrently with each other have been scheduled in Hamilton, Ontario, Canada, for June 9 and 10. On June 9, and into the morning of June 10, a high polymer forum will be held. The forum will be jointly sponsored by the Chemical Institute of Canada and the Synthetic Rubber Research Project Subcommittee of the National Research Council. The Rubber Division of the C.I.C. will hold its technical sessions on June 10. Headquarters for the conference will be the Royal Connaught Hotel. Further details will be made available shortly. J. T. Black, of the Polymer Corp., Sarnia, Ontario, is secretary of the C.I.C. Rubber Division.

PASSENGER CASING SHIPMENTS DROP 14% FROM 1947 TOTALS

Manufacturers' shipments of passenger casings during the year 1948 totaled 63,516,542 units, a decline of 14.29% from the all-time peak year 1947 when 74,109,453 casings were shipped, the Rubber Manufacturers Association reported recently. Shipments of truck and bus casings were also lower in 1948, with 14,258,140 casings shipped, as compared with 17,073,911 during 1947. Total automotive casings shipped in 1948 amounted to 77,774,682 units, against the 91,183,364 units shipped in 1947.

A total of 81,368,134 automotive casings were produced in 1948, of which 66,780,127 were passenger casings, and 14,588,007 were truck and bus casings. During 1947, 95,550,136 units were produced of which 77,795,299 were passenger casings and 17,754,837 were truck and bus casings.

Inventories at the end of 1948 stood at 10,722,073 automotive casings. Of these, 8,788,907 were passenger and 1,933,166 were truck and bus casings. At the end of 1947, 6,949,292 automotive casings were on hand, of which 5,444,071 were passenger and 1,505,221 were truck and bus casings.

A total of 68,457,397 automotive and truck and bus tubes were shipped during 1948. This compares with a total of 74,088,142 units shipped in 1947. Tubes produced during 1948 amounted to 70,149,819 units. Tubes produced during 1947 totaled 79,180,571 units. At the end of 1948, 9,734,490 tubes of all types were on hand. At the end of 1947, 8,059,315 tubes were on hand.

Offers Consulting Service

Dr. Alyn M. BeDell, formerly associated with the Inland Rubber Corporation and the Chicago Belting Co., has organized the Rubber Manufacturers Service, with temporary headquarters at 1429 North Clark St., Chicago 10, Ill. The new concern is offering an all-around consulting service to rubber, plastics and other manufacturers, specializing in rolls and roll coverings. Dr. BeDell has had extensive experience in the field of rubber and plastics. Prior to entering the rubber field proper, he was engaged in similar work for some 21 years with the North American Aviation Corporation. He has done considerable work on the development of non-inflammable rubber compounds. He is a graduate of the College of Applied Sciences, Edinburgh, Scotland, where he secured a Ph.D., his treatise covering rubber. He has also spent some time on rubber plantations in Malaya.

Drops Nonyl Alcohol Plans

Plans of the Indoil Chemical Co., Chicago, Ill., to build a nonyl alcohol plant have been abandoned for the present, company officials recently stated. The firm introduced nonyl alcohol last fall in experimental quantities. A spokesman for the Standard Oil Co. of Indiana, the parent concern, said that the plant has been eliminated from the firm's present construction program because of high construction costs.

Biography of F. W. Stavely

F. W. Stavely

As reported in a recent issue, Dr. F. W. Stavely, director of research of the Firestone Tire & Rubber Co., has been elected chairman-elect of the Division of Rubber Chemistry, A.C.S., to take office in 1950. A biography of Dr. Stavely follows:

Dr. F. W. Stavely was born in Lyndon, Kansas, in 1894. He received his bachelor's degree in 1916 from Sterling College, Sterling, Kansas. He became interested in rubber in 1917 as a result of a survey of the status of synthetic rubber research as a requirement for a master's degree at the University of Chicago. This was followed by four years of experience as a research chemist on the U. S. Rubber Company's plantation in Sumatra. He returned to the University of Chicago and obtained his Ph.D. degree in organic chemistry in 1922.

Dr. Stavely accepted a position in the Research Laboratory of the Firestone Tire and Rubber Company in 1922 and has since been associated with Firestone. During this time he served in turn as research chemist, manager of the laboratory and development departments of the Firestone Tire and Rubber Company of California, technical sales representative in Akron, manager of truck and tractor tire sales of the California company, and personnel director of the Firestone Akron organization.

During World War II he was in charge of bullet sealing fuel cell and oil cell development in the various factories operated by Firestone, and at present is director of the chemical and physical research laboratories in Akron.

Dr. Stavely is a charter member of the Akron Section of the American Chemical Society and was vice-chairman of this group in 1927. In 1930 he was chairman of the Rubber Section of the American Chemical Society at Los Angeles. He is a member of the American Chemical Society, Society of the Plastics Industries, Industrial Research Institute, Sigma Xi, Division of High Polymer Physics of the American Physical Society, American Association for the Advancement of Science, and a Fellow of the American Institute of Chemists.

PRODUCTION OF BLACK IN 1948 FELL 1.6% FROM 1947 TOTAL

According to the U. S. Bureau of Mines, production of carbon black in 1948 was 1.6% less than in 1947, due to a 7% decrease in furnace black output. Channel black produced during 1948 totaled 676,397,000 pounds, and furnace black to 620,600,000 pounds, for a total of 1,296,997,000 pounds. Channel black produced during 1947 amounted to 654,128,000 pounds and furnace black to 664,346,000 pounds, for a total of 1,318,474,000 pounds.

A total of 1,253,081,000 pounds of black were shipped during 1948, of which 657,229,000 pounds were of the channel type and 595,852,000 pounds were of the furnace type. In 1947, 1,322,298,000 pounds were shipped, of which 664,178,000 were channel and 658,120,000 pounds were furnace.

Producer's stocks increased 61% over 1947 to the highest level since the end of 1943. At the end of December, 1948, 26,124,000 pounds of channel black and 90,196,000 pounds of furnace black were on hand for a total of 116,320,000 pounds. At the end of 1947, 6,956,000 pounds of channel and 65,448,000 pounds of furnace, or a total of 72,404,000 pounds of black, were on hand.

Exports increased 1% over 1947 to a record of 321,915,000 pounds, equal to 26% of total shipments.

Safety Equipment Laboratory

Research and development of safety equipment for all industries will be undertaken in a new laboratory, said to be the largest of its kind in the world, to be built by the Mine Safety Appliances Co., Pittsburgh, Penna. George H. Deike, president of the company, has announced plans for the construction of a four-story laboratory building which is expected to be completed in September, 1949. Facilities for the laboratory will be made available to all industry for the investigation of safety equipment problems affecting health and property. Activities of scientists there will be coordinated with those of the U. S. Bureau of Mines, U. S. Public Health Service, Industrial Hygiene Foundation of Mellon Institute, Harvard School of Public Health, the new School of Public Health at the University of Pittsburgh and fellowships at other leading universities. Dr. William P. Yant will be in charge of the laboratory.

Ohio-Apex Sales Agents

Ohio-Apex, Inc., Nitro, W. Va., has announced the appointment of new sales agents to represent the company in their respective areas. Each of the representatives will carry stocks of Ohio-Apex plasticizers in their warehouses. The new sales representatives are: Amsco Solvents & Chemicals Co., Cincinnati, Ohio; Ohio Solvents & Chemicals Co., Cleveland, Ohio; Hoosier Solvents & Chemicals Co., Indianapolis, Ind.; Missouri Solvents & Chemicals Co., St. Louis, Mo.; Southern Solvents & Chemicals Co., New Orleans, La.; and the Texas Solvents & Chemicals Co., Houston, Tex.

SPRING MEETING OF A.S.T.M. FEATURES SYMPOSIUM ON AGING OF RUBBER

The 1949 Spring Meeting of the American Society for Testing Materials, which was held during A.S.T.M. Committee Week, February 28 to March 4, featured a Symposium on Aging of Rubbers, presented under the auspices of Committee D-11 on Rubber and Rubber-Like Materials. The Symposium was held on March 2 at the Edgewater Beach Hotel in Chicago and attracted an attendance of approximately 400 members and guests.

Numerous meetings of various subcommittees of Committee D-11 were held during committee week, results of which will be published in an early issue. Committee D-11 also sponsored a special luncheon on March 3, attended by some 100 members, at which special tribute was paid to the activities of Arthur W. Carpenter (Goodrich) as long-term secretary of the committee.

The Spring Meeting on March 2 was officially opened by R. L. Templin, president of the A.S.T.M., who briefly reviewed the early organization and development of Committee D-11 and commended it for preparation of the aging symposium. The meeting was then turned over to Simon Collier (Johns-Manville), chairman of Committee D-11, who paid special tribute to the group which arranged the symposium. This group was headed by G. C. Maassen (Vanderbilt) as chairman, and included the following: H. E. Outcault (St. Joseph Lead), R. D. Stiehler (Bureau of Standards), L. V. Cooper (Firestone), L. E. Cheyney (Pollock Paper), A. E. Juve (Goodrich), T. A. Bulifant (Barrett), H. E. Charles (Hazard Insulated Wire), M. G. Schoch, Jr. (Hewitt Rubber), and G. A. Wilson (A.S.T.M.).

The meeting was then turned over to Mr. Maassen, who acted as technical chairman. The Symposium covered six specific papers, with spirited discussion on several of them. Titles, authors and abstracts of all six papers follow:

Abstracts of the Papers

Mode of Attack of Oxygen on Rubber, *by A. M. Neal and J. R. Vincent (DuPont Rubber Laboratory, Wilmington, Delaware)*—It has long been recognized that rubber, because of its unsaturization, is degraded by atmospheric oxygen, and, in contrast with most unsaturated materials, a very small degree of oxidation is sufficient to destroy its characteristic properties.

The oxidation of rubber, whether vulcanized or unvulcanized, is a complicated process, involving several reactions, each of which is influenced differently by conditions. The existence of more than one reaction is illustrated by reference to the influence of: (1) a given material on raw and vulcanized rubber; (2) chemicals on mill breakdown; (3) different antioxidants in an otherwise similar stock; (4) combinations of metal catalysts; (5) oxygen pressure on the temperature coefficient of the oxidation; (6) temperature on the amount of oxygen required for degradation; and (7) different aging conditions.

Oxygen-Absorption Methods: Their Utility and Limitations in the Study of Aging, *by J. Reid Shelton (Case Institute of Technology, Cleveland, Ohio)*—The three methods commonly employed for oxygen-absorption studies (namely, gravimetric, manometric, and volumetric) are briefly reviewed and compared. Illustrative examples of the use of the volumetric method for study of aging are presented.

The limitations of the method are said to be no more numerous or serious than those of other aging tests. The data are shown to be reproducible and to correlate with changes on physical properties. It is recommended, however, that the data be used in conjunction with other aging tests and not as the only criteria of aging resistance.

Oxygen absorption methods are said to offer great promise for continued use in the study of aging, and also for possible use as a test for predicting the probable relative resistance to aging in service. The need for further study to establish more precisely the degree of utility and the limitations of the method for such purposes is recognized.

Chemical Changes in Elastomers and Antioxidants during Aging, *by John O. Cole (Goodyear Research Laboratory, Akron, Ohio)*—While the marked changes in physical properties of elastomers which occur during aging are well recognized, until recently very little was known concerning the nature of the chemical changes. The object of this paper is to review the present status of knowledge concerning the chemical changes which occur in elastomers and antioxidants during thermal and photochemical oxidation.

Since definite conclusions are difficult or impossible to obtain by direct experimentation with polymers, indirect methods involving study of low molecular weight hydrocarbons are often used. The best approach to the problem appears to involve investigation of the oxidation products of low molecular weight olefins closely related to the polymer in chemical structure. Beginning with a simple olefin, the effect on the nature of the oxidation products produced by increasing the size and complexity of the molecule is determined. On the basis of such data and reasoning by analogy the reactions most likely to occur in the polymer are deduced. This method of approach is illustrated by reviewing the work of Farmer and his co-workers on the oxidation of cyclohexene, methyl cyclohexene, methyl oleate, low molecular weight polyisoprenes of the type H $(CH_2-C(CH_3)=CH-CH_2)_nHn=2$, 3 and 6 and unvulcanized natural rubber.

Of the experimental methods applicable to direct study of polymer oxidation products infra-red methods are among the most promising. The infra-red absorption spectra of elastomers undergo marked changes as the result of oxidation. The interpretation of these changes is discussed and it is shown that C—O, O—H, and C—O groups are formed as the result of oxidation. The gradual saturation of double bonds is also shown.

Antioxidant consumption during natural and artificial aging is demonstrated by analytical methods. With aromatic amines the secondary amine groups are destroyed during aging and part of the antioxidant appears to combine with the polymer.

Physical Aspects of the Aging of Rubber, *by M. C. Throdahl (Monsanto Chemical Co., Nitro, West Va.)*—Within the past ten years the general trends of theory and experimental evidence suggest that aging or degradation is quite like polymerization in nature. These reactions are chain mechanisms, the physical changes of which are the net sum of several simultaneous processes: (a) cross linking, cyclization, and continued polymerization which harden and stiffen the rubbers, and (b) scission which produces tackiness in the rubbers and results in loss of tensile strength. The relative degree to which different rubbers are susceptible to these mechanisms is discussed.

Effects of Light and Ozone on Rubber, *by John T. Blake (Simplex Wire & Cable Co., Cambridge, Mass.)*—The action of light and ozone on rubber is manifested in a variety of ways. Light can apparently depolymerize rubber, it can bring about its vulcanization either in the presence or absence of vulcanizing agents, and it can catalyze the oxidation of both raw and vulcanized rubber. The activation of the oxidation of unvulcanized raw rubber by light is susceptible to catalysis, both positive and negative, by various organic chemicals. Their action bears little relation to and may be opposite from the effect of these materials on the oxidation of vulcanized rubber in the dark. Light-catalyzed oxidation is largely a surface effect in contrast to that in the standard accelerated oxidation tests which are largely a bulk affair.

The cracking of statically and dynamically stressed rubber seems to be due not to the direct action of light, but to dilute ozone generated in the atmosphere by sunlight. It is, therefore, closely related to the cracking of stressed rubber in dilute ozone, and the mechanism of each is probably identical with that of cracking in concentrated ozone. Frosting and atmospheric and dilute ozone cracking can be controlled by various organic chemicals or suitable protective coatings.

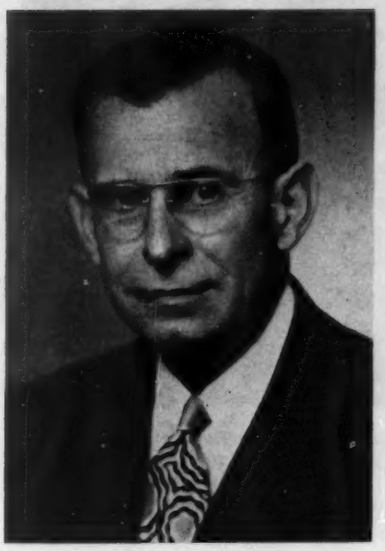
The Effect of Temperature on the Air Aging of Rubber Vulcanizates, *by M. J. Schoch, Jr. (Hewitt Rubber, Buffalo, N. Y.) and A. E. Juve (Goodrich Research Center, Brecksville, Ohio)*—The purpose of this report was to show the effect of the temperature of exposure in an air aging test on the rate of deterioration of the properties of typical vulcanizates of natural rubber, GR-S, GR-I, fibrile rubber and neoprene.

The results show that over the temperature range of 70°C. to 125°C. the rate of deterioration is dependent on temperature and the temperature co-efficient of aging varies between 1.82 and 2.87/10°C. depending on the composition of the material and the property being measured.

The nature of the deterioration in all materials tested is the same over this temperature range except for those materials which develop a non-homogeneous cross section during aging. Above 125° C. all the materials tested appeared to undergo a different kind of deterioration.

The test tube method of air aging was found to be approximately equal in severity to the oven method and appreciably more reproducible between laboratories.

Dougherty Named U. S. Secretary



William M. Dougherty

William M. Dougherty has been elected secretary of the United States Rubber Co. to succeed the late Eric Burkman. Mr. Dougherty has been associated with the company for 26 years and recently has been serving as assistant to the president. He was graduated from Princeton University in 1919 and shortly thereafter went to work for a Wall Street investment firm. In 1923 he became a member of the commercial research department of U. S. Rubber. Later he was appointed coordinator of production and sales in the company's Detroit tire plant. In 1934 he was placed in charge of the central sales and production coordination department, and in 1941 was elected assistant secretary of the company. He was appointed assistant to the president in 1947.

Dayton Enters Foam Field

After a protracted period of careful experiment, the Dayton Rubber Co. is entering the foam sponge rubber field. Machinery has already been installed and production will begin shortly. The type of sponge to be manufactured is under a patented process, controlled in the United States by Dayton Rubber and one other company. The product is said to be fully equal and in some respects superior to that now on the market. Moreover, the process is believed to be somewhat less costly.

Reduces Prices on Chemicals

The J. M. Huber Corp., New York, has announced price reductions of ½c per pound on both Natac and Putac and ¾c per pound on Turgum S. The new price on Natac now ranges from 10 to 11c a pound, depending on quantity, that of Butac from 10½ to 11½c a pound, and that of Turgum S from 8¾ to 9¾c a pound. According to R. H. Eagles, company vice-president, the lower prices are due to reduced production costs.

LABOR NOTES

Negotiations were begun on February 23 between representatives of the Ohio Rubber Co. and the local URW union at Willoughby, Ohio, for a new contract based on proposals of the union's international for a 25-cent-an-hour increase and a $100-a-month company-financed pension plan.

A policy covering wages and working conditions for the 89 production workers at the government-owned synthetic rubber plant in Akron has been signed between the University of Akron and the AFL. The agreement includes inequity adjustments for various workers, wage differentials for foremen, 12 days' sick leave a year, and fringe concessions.

A six-weeks old strike at the Texas City, Texas, plant of the Carbide & Carbon Chemicals Corp. ended on March 6. Workers were granted wage increases up to 18 cents an hour for operators and up to 14 cents an hour for maintenance men. The company retained the right to assign operators to do minor repairs to keep production units running, or when they are down, or in time of emergency.

Representatives from some 20 rubber unions in the Akron area have lodged a protest against "congressional stalling" on pending national labor legislation. Individual members have also been urged to enter similar protests with their congressmen.

Workers at the Tuscaloosa, Alabama, plant of the B. F. Goodrich Co. voted to return to work on February 24 after a 10-day shutdown, said to be the result of a spontaneous walkout. The walkout was attributed to new work assignments given to two men.

Goodyear Completes New Film

A new kind of motion picture that draws a sharp, graphic contrast between the two dominant ideologies in the world today—the totalitarian creed and the American way of life—has been completed and made available to groups of all kinds by the Goodyear Tire & Rubber Co., Akron. It is the story of a foreign born worker who learns that the freedoms enjoyed in a democratic nation are the most priceless possessions known to man. The film runs to 32 minutes and is available for showing to large groups without charge. Requests should be addressed to Public Relations Department, Goodyear Tire & Rubber Co., Akron, Ohio.

California Hears K. Rostler

Mrs. Kathleen S. Rostler, editor of the Rubber Formulary, Bakersfield, Calif., was the principal speaker at the meeting of the Northern California Rubber Group held on February 24 at Angelo's Restaurant in Emeryville, Calif. Mrs. Rostler spoke on "The Advantages of Punch Cards Over Notebooks for Recording Rubber Compounds." The talk was followed by a spirited question-and-answer period.

Davidson Rubber Names Turke

Stephen P. Turke

Stephen P. Turke, formerly associated with the Cambridge Rubber Co., has been appointed general manager and a director of the Davidson Rubber Co., Boston, Mass. Mr. Turke is a graduate of the Bentley School of Accounting and Finance, class of 1935. He attended the Boston University School of Business Administration from 1935 to 1938. From 1939, Mr. Turke held various executive and administrative positions with Cambridge Rubber. He is a member of the Rubber Manufacturers Association, the American Chemical Society, the American Management Association, and was for several years director of the Cambridge, Mass., Chamber of Commerce.

Du Pont Neoprene Type RT

The Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has introduced Neoprene Type RT, a new, improved general purpose polymer. The new polymer is stabilized with a non-discoloring antioxidant, and will retain tack longer and resist vulcanizate crystallization, the company states. Neoprene RT finds use in friction stocks where its improved tack retention assures excellent adhesion, as well as in roll covering, conveyor cover and sheet stocks. The company claims that due to its non-discoloring antioxidant, Neoprene RT is stable in storage and may be used in stocks where minimum staining or discoloration is required. Complete information on the use of the product may be found in Report 49-2, issued by the Rubber Chemicals Division.

Klinger-Dills Appointed

The Klinger-Dills Co., Dayton, Ohio, has been appointed exclusive distributor of the Belting Division of the Russell Manufacturing Co., Middletown, Conn. Products of the Russell company's Belting Division include Rusco conveyor and transmission belting and endless high speed belts.

PLAN 130-MILE RUBBER BELT CONVEYOR LINE TO HAUL ORE AND COAL

Formation of a new corporation, the Riverlake Belt Conveyor Lines, Inc., to build a $210,000,000 overland rubber belt conveyor transportation system between Lake Erie and the Ohio River, was announced recently by the Akron, Canton and Youngstown Railroad in Cleveland, Ohio. Engineers of the Goodyear Tire & Rubber Co. and the Link Belt Co., Chicago, Ill., designed the conveyor, which will have to carry 30,000,000 tons of ore, coal and limestone a year to make it pay. The projected capacity of the system is 52,000,000 tons.

Describing the elevated, two-way conveyor line as "the railroad of tomorrow—an ultra modern method of transporting bulk cargo in volume," H. B. Stewart, Jr., president of the Akron, Canton and Youngstown Railroad, asserted that the system would save from $20,000,000 to $45,000,000 annually in freight rates on iron ore, limestone and coal consumed by steel mills and other industries in Eastern Ohio and the upper Ohio River valley, including Pittsburgh. Mr. Stewart is married to Catherine Seiberling, niece of F. A. Seiberling, founder of Goodyear.

The main line of the conveyor system, designed to handle bulk cargoes only, will be a two-way belt extending a distance of 103 miles from Lorain on Lake Erie to a terminal on the Ohio River near East Liverpool. Spur lines would serve Youngstown and Cleveland, Ohio, comprising a total system of 130 miles. The project will be financed by private capital and no stock issue will be offered to the public. It was estimated that a minimum of three years will be required to construct the lines.

Mr. Stewart stated that the route chosen is ideally situated for the two-way application of the rubber belt conveyor. Iron ore moving from the lake south-bound and coal north-bound from the river are in sufficient volume to pay off the cost of the construction in 20 years while at the same time permitting rates low enough to save from 50 cents to $1.50 a ton on the transportation of coal and from 47 cents to 68 cents a ton on iron ore delivered to steel mills in Youngstown and Pittsburgh.

Minimum Cargo Required

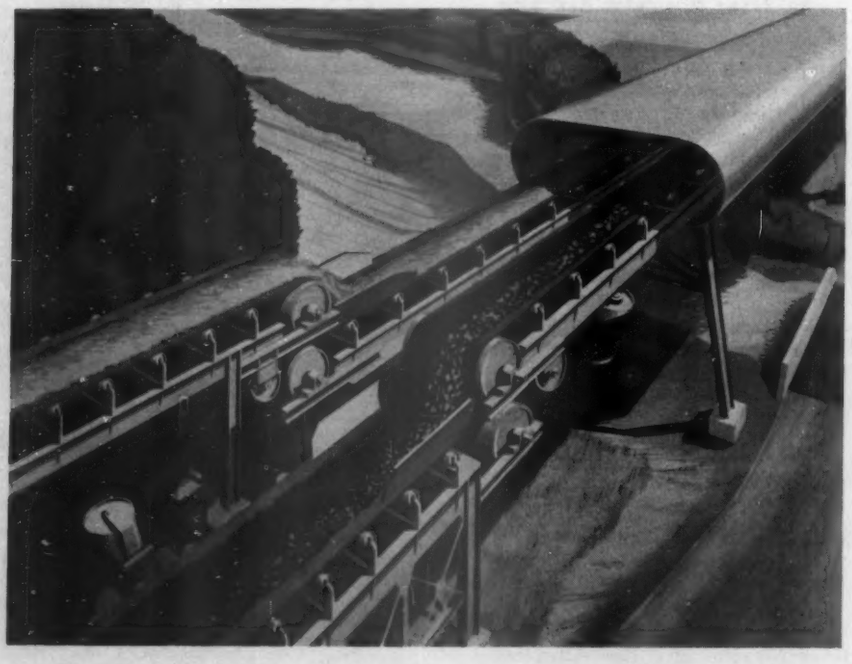
Minimum cargo volume required by the lines, Mr. Stewart said, will be 30 million tons, possibly 15 million tons each of coal and iron ore, but the same belts will have a total capacity of 52 million tons at which volume the maximum savings would be passed on to the consumers. Modern terminal facilities, to save valuable turn-around time for lake ore vessels, will be constructed as separate units of the Riverlake Belt Conveyor Lines. Another feature will be a coal washing plant which will clean and grade untreated coal enroute. These services will cost $56,000,000, leaving approximately $154,000,000 for the construction of the actual conveyor system.

It has been estimated that 18,000,000 tons of additional coal to supply the conveyor lines would be required out of the fields, or other sources available to river barge lines, each year. Huge storage and stockpiling areas are planned along the conveyor system which will permit the mines to operate on a steady year round schedule.

Traffic on the Ohio River almost will be doubled through the new tonnage volume that would be added by the conveyor project. In addition to the 18 million tons of new coal there would be 15 million tons of ore. The total volume of all cargo handled by barge on the Ohio in 1946 was just short of 36,000,000 tons. This increase in river traffic would require a considerable number of new barges and tow boats on the river to handle the additional volume.

Artist's conception of an engineer regulating the flow of bulk cargo over the conveyor system. Five such control points at key junctions and terminals will serve as nerve centers for the system.

Many far-reaching economic repercussions from the construction of the conveyor lines were predicted. Foremost among these is the stabilization of the steel industry in the area. Proponents of the system declare that it is vital to local and national economy, and represents an integral part of national defense.



Typical transfer point on the Riverlake Belt Conveyor Lines is shown as loads of coal and iron are relayed from one belt to another. In each flight, the doubling back of separate units of belt result in a "twin track," one for north-bound coal and the other for south-bound ore both moving at the rate of 650 feet a minute.

Some Technical Features

The elevated structure will have a minimum clearance of 22 feet and the metal gallery atop the steel supports will be fully enclosed. Electrically operated, the belt movements will be controlled by a push-button system with an electric warning device able to locate distress points and stop the entire line immediately.

A total of 172 belts or flights, some of them more than a mile long, will be required on the 103-mile two-way main line. This will move coal north-bound over a 72-inch belt from the river at the rate of 600 feet per minute or 3,400 tons per hour. The opposite or south-bound belt will carry iron ore at the same rate of speed but because of the greater weight of the cargo the volume will total 5,400 tons per hour in a continuous flow over a 60-inch belt line.

The four largest cost factors to be considered in the construction of the actual conveyor system are 151,000 tons of structural steel, 267 miles of rubber belting, 400,000 troughing idler units, and 217 terminal power units. Manhours required to construct the line and component parts have been estimated in excess of 32,000,000.

Technical Reports Available

The Indonesian Rubber Research Institute, Buitenzorg, Java, has made available a number of new technical reports on rubber and latex, many of them in English. Copies of these reports are available on direct application to the Institute. Titles, authors and communication numbers of some of the reports follow:

The Sol-Gel Problem in Fresh Plantation Rubber. By A. J. Verbrugh. In Dutch, with an English summary. (Communication No. 38).

A Comparison of the Properties of Rubber Vulcanized by Different Methods, Obtained from Several Latices, All of Them Prepared from One Field Latex. By J. W. van Dalfsen. In Dutch, with an English summary. (Communication No. 39).

Notes on Latex and Rubber of Ficus Elastica. By G. J. van der Bie. In French. (Communication No. 47).

Centrifuging of Latex. By G. J. van der Bie. In English. (Communication No. 48).

Chemical Changes in Ammoniated Hevea Latex. By R. F. A. Altman. In English. (Communication No. 53).

Natural Antioxidants in Hevea Latex. By R. F. A. Altman. In English. (Communication No. 54).

Natural Vulcanization Accelerators in Hevea Latex. By R. F. A. Altman. In English. (Communication No. 55).

A Simple Capillary Viscosimeter. By Dr. G. E. van Gils. In English. (Communication No. 57).

Spontaneous Coagulation of Hevea Latex. By Dr. G. E. van Gils. In English. (Communication No. 58).

Complexity of Fresh Hevea Latex. By L. N. S. Homans, J. W. van Dalfsen, and G. E. van Gils. In English. (Communication No. 59).

Determination of Minute Quantities of Phosphate, Calcium and Magnesium in Rubber. By G. J. van der Bie. In English. (Communication No. 60).

Rubber in Asphalt Roads. By G. J. van der Bie. In Dutch. (Communication No. 61).

Smoked Sheet Rubber from Borneo. By G. J. van der Bie and G. E. van Gils. In Dutch, with a brief summary in English. (Communication No. 62).

Rubber as a Binding Material for Grafting. By G. E. van Gils. In Dutch. (Communication No. 63).

Mealorub Rubber Powder. By G. E. van Gils and J. C. de Neef. In Dutch, with an English summary. (Communication No. 68).

Acquires Wills Machine Co.

The Ferry Machine Co., Kent, Ohio, builders of special machinery for the rubber and other industries, recently acquired the Wills Rubber Trimming Machine Co., of Canton, Ohio, and henceforth will operate it as a division with offices at Kent. The Wills concern produces high-speed trimming machines and sub-zero tumblers for the deflashing of rubber and plastic products, among other items. Harry E. Wills, general manager of the company, died recently.

Metz Heads Okonite Co.

Albert F. Metz

Albert F. Metz was elected president and general manager of the Okonite Co., Passaic, N. J., by the board of directors at their regular meeting held in New York City on January 25, 1949. Mr. Metz, previously vice-president and treasurer of the company, succeeded Frank C. Jones, who died recently. The board also elected as a director, Stephen A. Wilson, the company's general counsel, and elected Donald R. Stevens as executive vice-president and a member of the executive committe.

Mr. Metz joined the Okonite company in 1919 as accountant, following a previous career as assistant to the comptroller of the Famous Players Lasky Corp., and as a disbursing officer and auditor for the United States Shipping Board during World War I. During his 30 years with the Okonite company he also served as comptroller and treasurer. Active in civic and community affairs, Mr. Metz is president of the American Taxpayers Association, and of the Passaic Chamber of Commerce.

Donald R. Stevens, newly elected executive vice-president of the company, joined the organization in 1921 as superintendent and became vice-president and works manager of its three plants including Okonite in Passaic, the Hazard Insulated Wire Works Division, Wilkes-Barre, Penna., and the Okonite-Callender Cable Co., Paterson, N. J. He is also a director of the Okonite company, the First Paterson (N. J.) National Bank & Trust Co., and the New Jersey Taxpayers Association.

Electric Auto-Lite Co.

For 1948: Net profit of $12,196,493, which is equal to $8.16 a share, compared with $10,714,987, or $7.17 a share, in 1947. Net sales for 1948 amounted to $210,070,435, against $185,991,022 in 1947. Balance sheet items as of December 31, 1948, reveal current assets of $73,887,621, and current liabilities of $27,737,111, compared with current assets of $70,773,468, and current liabilities of $23,129,982 in 1947.

Plan Change in Capitalization

Stockholders of the Norwalk Tire & Rubber Co., Norwalk, Conn., will be asked to vote to increase authorized common stock to 500,000 shares from the present 315,000 shares to take care of any increase in the conversion rate of bonds into stocks, company directors said recently. Voting will take place at a special meeting on March 28. The company seeks to change the conversion rate of bonded debt into common stock and also seeks the right to mortgage or pledge the property and assets of the company in an aggregate amount not to exceed $750,000. According to a company spokesman, the change would allow the company to bolster its working capital and pay back excise taxes owed the government. It was recently revealed that Norwalk failed to pay these taxes in the sum of $205,696 for the period between January 21 and August 31 last year. The company is also well along in its plans to obtain a loan of some $500,000 from the Reconstruction Finance Corp. This will be undertaken if the necessary changes in capitalization are authorized at the March 28 meeting.

Cabot Names Delacour-Gorrie

Godfrey L. Cabot, Inc., Boston, Mass., has appointed Delacour-Gorrie, Ltd., Toronto, Canada, as exclusive representatives for the sale of carbon black and pine distillates throughout Canada. P. H. Delacour and F. R. Gorrie recently retired from Harrisons & Crosfield, Ltd., to form Delacour-Gorrie, Ltd. The new company will also act as sales agents for the General Atlas Carbon Co., Pampa, Texas, subsidiary of Cabot. Mr. Delacour had been associated with Harrisons & Crosfield for 15 years as manager of the Ontario Division and in 1944 was appointed to the board of directors of that company. Mr. Gorrie graduated from the University of Toronto in 1935 with a degree in chemical engineering. He was associated with the Canada Printing Ink Co., Ltd., from graduation until 1942 when he joined the sales staff of Harrisons & Crosfield. He is past president of the Toronto Paint & Varnish Production Club, and a former member of the National Federation of Paint & Varnish Production Clubs. The head office of Delacour-Gorrie is at 880 Bay Street, Toronto, Canada.

Preparing Market Research Data

In response to current demand from the business field for information useful in setting up marketing programs, the U. S. Department of Commerce will issue a 1949 edition of "Market Research Sources," last published in 1940. Questionnaires have already been mailed out to contributors to former editions. The new edition will include research groups which have developed new sources of marketing information since the 1940 edition was published. Inquiries should be addressed to the Marketing Division, Department of Commerce, Washington, D. C.

TECHNICAL FABRIC SYMPOSIUM FEATURES AKRON GROUP MEETING

Approximately 470 members and guests attended the Winter Meeting of the Akron Rubber Group, which was held at the Mayflower Hotel in Akron, Ohio, on February 18, and which featured a Technical Symposium on Industrial Fabrics. The attendance was the largest recorded for a technical meeting of the group and is a tribute to the careful planning of the symposium. Amos W. Oakleaf (Philblack) is chairman of the group's Program Committee.

A short business session was held before the symposium was presented, with Chairman Henry F. Palmer presiding. Dr. Palmer announced that the Nominating Committee had presented the following nominees for the 1949-50 season, with elections to be held by letter ballot: *Chairman,* C. A. Ritchie; *Vice-Chairman,* Bert Stangor and Amos W. Oakleaf; *Secretary-Treasurer,* C. G. Cashion and D. F. Behney.

Ralph Appleby (DuPont) then reported as a member of a special committee delegated to make recommendations with regard to the structure of the group. The committee recommended that no effort be made at present to incorporate the group, but that a board of trustees be set up at a later date. It also recommended that annual dues of $1.00 be established and that funds be permitted to accumulate up to a maximum of $1,500 in the treasury. All of these three recommendations were put to a vote and approved.

Both F. W. Stavely (Firestone), the vice-chairman of the Rubber Division, A.C.S., and Emil H. Krismann (DuPont), one of the liaison representatives of the Division, were called upon and each made brief addresses regarding Division activities, including the forthcoming meeting in Boston next May. It was also announced that the next meeting of the Akron group would be held on April 15 and that an outing would be held on June 17, with Bill Ayscue (DuPont) as chairman.

Symposium on Fabrics

The Symposium on Industrial Fabrics featured two papers and a panel discussion. The first paper was on "Cotton as a Raw Material for Industrial Fabrics," prepared by W. F. Busse and H. R. R. Wakeham of the Institute of Textile Technology, Charlottesville, Va., and presented by Dr. Wakeham. The second was on "Synthetic Fibers in Industrial Uses" by W. W. Owen, of the Rayon Division, E. I. du Pont de Nemours & Co., Wilmington, Del. Originally, this paper was scheduled for delivery by C. H. Froeling, who was replaced by Dr. Owen.

There were six panel speakers, as follows: E. M. Penny (Owens-Corning Fibreglas), A. H. Burkholder (Industrial Rayon), R. W. Elder (National-Standard), H. S. Grew, Jr. (Wellington Sears), H. B. Shearer (American Viscose), and A. B. Baker (American Viscose). Each of these speakers presented brief replies to specific questions submitted prior to the meeting. The full question-and-answer forum will be published in an early issue of RUBBER AGE.

In his talk on cotton, Dr. Wakeham discussed some of the factors which may tend to reduce the price of cotton and to make it a more useful fiber, thus improving its competitive position in the field of industrial fabrics. The speaker mentioned that some of the factors responsible for the dominant position of cotton in the past were its widespread availability, its low cost and its good physical properties.

Dr. Wakeham observed that the present price of cotton is such that part of the market for tire cord has now gone to rayon. Because cotton is our most important textile fiber, he said, a substantial part of the initial research work of the Institute of Textile Technology has been on the structure of cotton fibers and on the relation of fiber properties to spinning behavior. The results of many of these studies on cotton may be expected to have applications to synthetic staple fibers, he noted.

The physical properties of cotton and synthetic staple fibers were compared by Dr. Wakeham. The cotton industry no longer thinks that cotton has to be used because it always has been used and, consequently, does not require improvement, he said. Research in all phases of cotton production and utilization has already resulted in better quality cotton at reduced cost. The failure or success of such work will probably determine whether cotton will continue to lose markets to the available synthetic fibers, or whether it will regain some of these markets that have already been lost, he concluded.

Dr. Owen, in his address on synthetic fibers in industrial uses, pointed out that the dynamic increase in consumption of high tenacity viscose yarn by the rubber industry within the past few years has been due to its ability to do a better job or to perform equally well at lower cost or, in many instances, to do a better job at lower cost. Its advantages are high strength per unit weight at normal and elevated temperatures, low gauge per unit of strength, high yardage per pound, uniform properties, and relatively stable price level.

The speaker stated that these properties are utilized in making stronger, thinner carcass tires that operate with lower temperature differential; longer life V-belts with low growth; and woven, knitted, and braided rubber hose of lighter weight or higher bursting pressures. Fabrics woven from this type of yarn having strengths up to 900 pounds per inch are used in wrapped hose, diaphragms, conveyor belts and flat transmission belts. Normal strength textile viscose rayon proved to be outstanding as a reinforcing material for bicycle tires.

The day of a universal fiber for the wide ramifications of the rubber industry is past, Dr. Owen observed. As old fibers are improved and new fibers developed, they will be used for specific applications determined by the balance between economics and characteristics of the individual fibers, he said. (EDITOR'S NOTE: Dr. Owen's paper will be published in full in an early issue of RUBBER AGE.)

Akron to Hear Dr. Houwink

"Rubber in Road Construction" will be discussed by Dr. R. Houwink, director of the Dutch Rubber Research Institute, Delft, Holland, at the spring meeting of the Akron Rubber Group, which will be held in the Mayflower Hotel, Akron, on April 15. This subject is of particular interest in the Akron area at present because several miles of one of the principal streets was recently resurfaced with a material containing a large percentage of ground rubber. Dr. F. T. Bokma, also of the Delft Institute, will accompany Dr. Houwink to Akron. The program committee is also endeavoring to secure Warren S. Lockwood as a co-speaker for the April meeting. Mr. Lockwood has recently returned from Europe and will be in a position to discuss present conditions in the rubber industry on the continent.

Boston Holds Ski Outing

Approximately 30 members of the Boston Rubber Group participated in a ski outing held on February 11, 12 and 13 at Mt. Ascutney in Windsor, Vt. Headquarters for the outing was the Juniper Hill Hotel in Windsor. Some of the members motored to Hanover, N. H., during the week-end to observe the ski jumping at the Dartmouth Carnival. Walter Edsall (Goodyear), Don Wright (Hood Rubber) and Alan W. Bryant (Binney & Smith) were on the Outing Committee which planned the affair.

Opens West Coast Branch Office

Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill., has opened a branch office in San Francisco, Calif. Walter A. Blair, who was associated with the Fansteel Metallurgical Corp., Chicago, Ill., before coming to Precision Scientific, has been placed in charge of the new office with headquarters at 582 Market St., San Francisco 4. Mr. Blair is a graduate of the University of Wisconsin where he studied chemical engineering.

Buffalo To Hear Searer

Dr. Jay Searer, director of research and development of the Industrial Resins Division of Durez Plastics and Chemicals, Inc., North Tonawanda, N. Y., will address the March 22 meeting of the Buffalo Rubber Group to be held at the Westbrook Hotel, Buffalo, N. Y. Dr. Searer will speak on "Phenolic Resins in Natural and Synthetic Rubber Compounds."

Rhode Island Club Sets Dates

The next meeting of the Rhode Island Rubber Club will be held on April 21 at the Metacomet Golf Club in East Providence, R. I., with Professor Smiley of Brown University as the speaker. The group has also announced that it will hold its outing on June 23 at the Pawtucket Golf Club in Pawtucket, R. I., and a meeting on November 17 somewhere in the Providence area.

KULLGREN AND STILLWELL ADDRESS CHICAGO RUBBER GROUP

The fifth regular meeting of the Chicago Rubber Group was held in the Morrison Hotel, Chicago, Ill., on February 4, with approximately 180 members and guests in attendance. The technical session of the meeting featured a symposium on recent developments and control equipment in calendering applicable to the rubber industry. G. V. Kullgren of the Adamson United Co. and N. R. Stillwell of the Foxboro Co. were the principal speakers.

Mr. Kullgren described the latest precision calenders suitable for rubber and plastics compounding. The new calenders are of the precision type capable of sheeting to a gauge of 4 mil with a tolerance of ±0.2 mil, said the speaker. These new precision calenders incorporate many new features, including coned gears which permit 100% contact of the gearing surfaces, thus making precision gearing possible.

Other new features stressed by the speaker are tapered roller bearings in place of sleeve bearings, to minimize end play in the rolls; automatic crown compensating devices; and drilled rolls for distributing the heat more evenly along the perimeter and length of the roll, thus overcoming temperature differentials usually encountered in cored rolls.

Mr. Stillwell described some of his company's precision instruments for use in the calendering operation. The thickness or weight of a stock is determined by the Verigraph. Mr. Stillwell observed that the operation is based on the change of capacity of a condenser by displacing one dielectric material (air) with another (the calendered stock).

In operation the Verigraph indicator is set at zero for the desired stock thickness or weight and the instrument records over and under weight. This instrument is particularly suited for gauging engraved stocks and for determining air pockets in calendered fabrics, said Mr. Stillwell.

For measuring roll surface temperatures, the speaker described his company's sensitive thermocouple in which frictional heat is reduced to a minimum by using a bimetal element with small contact area, held to the roll with a low spring pressure. Temperatures are transmitted to a recorder and are recorded intermittently every 6 seconds. Mr. Stillwell also described briefly the Foxboro Dynalog for recording data.

The after dinner feature was a complete showing of the recent Rose Bowl game between Northwestern and California Universities. Bob Voigts, head football coach of the Rose Bowl victors, gave a running analysis of the game and explained the various intricate plays. Jay Berwanger, secretary of the Hood Sponge Rubber Co., of Chicago, who officiated at the game was on hand to defend his decisions.

A mobile trailer exhibiting the numerous products of %Proportioneers, Inc.%, is currently touring the country. Some five tons of working equipment operated from a self-contained 110 volt a.c. motor generator set are utilized for the exhibition.

Latex Foam Cushioning

A particularly noticeable feature of the furniture markets at Chicago and Grand Rapids, Mich., early this year was the increased use of latex foam cushioning in the bedding and furniture shown. While manufacturers of modern furniture are still the chief consumers of foam, its use among traditional and period styles is increasing. Of special interest is the introduction of fully-molded latex foam construction in the medium and low-priced furniture field. Many manufacturers are now offering foam cushioning as an optional feature.

Gates Club Hears Patterson

The Gates Technical Club, sponsored by the Gates Rubber Co., Denver, Colo., was addressed by D. A. Patterson, president of the H. A. Astlett Co., New York, at its February 3 meeting, held at Cunningham's Restaurant in Denver. Mr. Patterson's subject was "Rubber Plantations Since the War." The speaker covered the present conditions of rubber plantations in Malaya, Dutch East Indies and Sumatra, Java and Ceylon. He also discussed the methods used by plantation owners in growing, collecting, and preparing rubber latex. Mr. Patterson also reviewed present market conditions and types of rubber grading which are under a more direct grower-buying relationship than before the war. Several movie reels of the Far East rubber plantations and surrounding country taken before the war were shown.

New York Meets on March 25

The presentation of two technical papers will feature the next meeting of the New York Rubber Group, to be held at the Henry Hudson Hotel in New York City on Friday, March 25. As usual, the technical session will be held in the afternoon, followed by dinner and entertainment. Sherman R. Doner, technical representative, Manhattan Rubber Division, Raybestos-Manhattan, Inc., will deliver an address on "Conductive Rubbers," and George S. Irby, Jr., of the Chemicals Division, General Electric Co., will talk on "Silicone Rubber."

Boston Meets on March 25

The Spring Meeting of the Boston Rubber Group will be held at the Somerset Hotel in Boston, Mass., on Friday, March 25. The technical meeting following dinner, which will be served at 6:30 P.M. sharp, will feature two speakers. Donald C. Chase, manager, rubber and plastics division, Farrel-Birmingham Co., Inc., will talk on "Modern Machinery for Rubber and Plastics," and Dr. Gilbert Thiessen, technical adviser, chemical division, Koppers Co., Inc., on "Plastics and Elastomers: Whence the Raw Materials."

WASHINGTON HEARS SEMON ON NEW PRODUCTS FROM RESEARCH

The eighth regular meeting of the Washington Rubber Group was held in the Assembly Hall of the Cosmos Club, Washington, D. C., on March 3. Principal speaker of the evening was Dr. Waldo L. Semon, director of pioneering research for the B. F. Goodrich Co. The subject of Dr. Semon's address was "New Products From Research."

In his address, Dr. Semon spoke of the advantages to be gained by industry and by the nation through research activities. He traced research activities at Goodrich through the past few decades and itemized some of the scientific advances and material benefits gained through these activities. Invention is no longer the hit-or-miss affair that it was a generation ago, he said. Now it has become an outgrowth of systematic fundamental research.

In industry, research is undertaken because it is realized that without research a company cannot remain competitive. Research tells us what we can do tomorrow when we cannot continue as we are doing today, the speaker stated. It is undertaken for hope of profit to be realized by more effectively meeting the needs of mankind. As the past of our country has been shaped by discovery and utilization, so may our future be determined by research and production, the speaker concluded.

Cox Addresses Southern Ohio

The February 17 meeting of the Southern Ohio Rubber Group, held in the Auditorium of the YMCA in Dayton, Ohio, was addressed by R. G. Cox, manager of molded and extruded mechanical goods sales for the B. F. Goodrich Co. After a short inaugural address by James L. Fitzgerald, chairman for 1949, Mr. Cox discussed the various types of rubber products and methods of processing in his talk, entitled "Engineering With Rubber." The speaker compared GR-S types with neoprene and natural rubber. Following the talk there was a short session of questions and answers during which time Mr. Cox commented on the problems of the rubber industry from the sales angle. A sound-color motion picture film, "Portrait of Industry," was shown through the courtesy of Calco Chemical.

To Speak at Chicago Meeting

The March 25 meeting of the Chicago Rubber Group, to be held at the Morrison Hotel in Chicago, Ill., will be addressed by Allyn I. Brandt, general sales manager of the B. F. Goodrich Chemical Co., who will speak on "Selling to the Rubber Industry—Then and Now," and John C. Dudley, of the Rubber and Plastics Laboratory of Chrysler Motor Corp., who will speak on "Automotive Mechanical Goods." These two talks will comprise the afternoon technical session. The after dinner program will feature a colored motion picture entitled "King Spruce," depicting scenes of logging operations in the preparation of pulpwood. William Gilman, Pulp Sales Manager of the Brown Co., will be the narrator.

NAMES IN THE NEWS

EDWARD E. STEVENS, former city editor of the *Akron Beacon-Journal*, has been named general sales manager of the Mansfield Tire & Rubber Co., succeeding J. S. WAINRIGHT who continues as vice-president and director of the firm.

CHARLES W. "DOC" WALKER, chief rubber research chemist for the American Steel & Wire Co., a subsidiary of U. S. Steel, retired recently after 38 years with the company.

GEORGE E. VICTOR has been elected president of the Victor Manufacturing & Gasket Co., Chicago, Ill., succeeding his father, JOHN H. VICTOR, who became chairman of the board.

PALMER W. SANDERS, formerly associated with the Pequanoc Rubber Co., recently joined the Essex Rubber Co., Trenton, N. J., as a senior development chemist.

DON FRASER, until recently associated with the Queen City Tulatex Corp., is now associated with the New Milford Rubber Co., New Milford, N. J.

MERTON E. PORTER, formerly associated with Dee's Adhesive & Chemical Co., has joined the chemical department of the Compo Shoe Machinery Corp., Boston.

CHARLES F. SAFREED, president of the McNeil Machine & Engineering Co., was recently elected a vice-president of the United Community Chest of Akron.

ROBERT J. BERGLUND, formerly with the American Lecithin Co., has joined the Lecithin Division of the W. A. Cleary Corp., New Brunswick, N. J., as sales representative.

ARTHUR W. CARPENTER, manager of testing laboratories for the B. F. Goodrich Co., Akron, recently received the Distinguished Service Award from the National Security Resources Board. He served the Board in Washington, D. C., for four months on loan from Goodrich.

SAM L. BROUS, formerly with the B. F. Goodrich Chemical Co. as a sales executive, is now marketing manager of the chemical department of the General Electric Co., with headquarters in Pittsfield, Mass.

DR. WILLARD D. PETERSON, formerly associate director of research and development for the J. T. Baker Chemical Co., has joined the staff of Arthur D. Little, Inc., Cambridge, Mass.

F. F. ASSMANN, until recently associated with the J. T. Baker Chemical Co., has joined the Thiokol Corp., Trenton, N. J., as a chemical engineer.

DR. EDWARD L. KROPA, head of resins and plastics research for the American Cyanamid Co. for the past six years, has joined the Chemical Division of the Borden Co. as chemical director.

WILLIAM J. PRITCHARD, associated with the Pharis Tire & Rubber Co. for more than 19 years, has joined the staff of V. L. Smithers Laboratories, Akron.

ROY M. VANCE, previously associated with the General Tire & Rubber Co. and the Miller Division of the B. F. Goodrich Co., has been appointed chief chemist of the Ohio Rubber Co., Willoughby, Ohio.

JOHN M. DOLAN, formerly vice-president of the LeRoi Co., Milwaukee, Wisc., has been appointed vice-president in charge of sales for the Hydraulic Press Mfg. Co., Mt. Gilead, Ohio.

CHESTER F. CONNER, associated with the B. F. Goodrich Co. for the past 39 years, has been appointed manager of the Industrial Products Sales Department of the company.

WILLIAM D. BENSON, previously associated with the Rayon Division of the American Viscose Corp. as general sales manager, has been appointed head of sales for the Industrial Rayon Corp., with headquarters in New York City.

DAN A. KIMBALL, vice-president and director of the General Tire & Rubber Co., has been named Assistant Secretary of the Navy for Air, succeeding NICHOLAS BROWN who recently resigned.

EDWIN J. FITZPATRICK, formerly vice-president and director of American Home Foods, Inc., has been appointed executive vice-president of the Industrial Tape Corp., New Brunswick, N. J.

WILSON O. GREEN, formerly manager of retail merchandising for U. S. Tires of the U. S. Rubber Co., has been appointed sales manager of the Fisk Tires Division of the company, succeeding H. M. RAMSAY who has been transferred to the U. S. Tires Division to supervise farm tire sales.

W. E. FOUSE, vice-president of the General Tire & Rubber Co., was recently nominated for life membership on the YMCA board of trustees in Akron.

CHARLES HEINTZMANN, executive assistant to the president of the U. S. Rubber Co., and associated with the company for more than 46 years, retired on January 1.

M. SCOTT MOULTON, of the B. F. Goodrich Chemical Co., Cleveland, has been elected secretary of the Society of Plastic Engineers.

FOSTER DEE SNELL, president of Foster D. Snell, Inc., New York, has been named by the Society of the Chemistry Industry, London, to receive the Society's Gold Medal for 1949, awarded bi-annually to a person who has attained eminence in applied chemistry.

RALPH S. DAMON, president of Transcontinental & Western Air, Inc., has been elected a director of the Goodyear Tire & Rubber Co., succeeding THOMAS E. WILSON, who resigned recently.

MAX POTASH, previously associated with the Chemical Division of the Tennessee Valley Authority, and more recently with Publicker Industries, Inc., has joined the staff of the American Polymer Corp., Peabody, Mass., to take charge of pilot development.

FRANK SLOAN GRAVES, sales manager of the Industrial Fabrics Division of Callaway Mills, Inc., has been appointed vice-president of the company.

GLEN M. HEIN, formerly associated with the U. S. Rubber Co., has joined the research staff of the Battelle Memorial Institute, Columbus, Ohio.

FRED W. STATEN, formerly with the Gates Rubber Co. as a research chemist, is now affiliated with the Petroleum and Oil Shale Research Station of the U. S. Bureau of Mines at Laramie, Wyoming.

RAYMOND B. SEYMOUR, formerly chief chemist of the Atlas Mineral Products Co., Mertztown, Penna., and more recently associated with Johnson & Johnson as director of special products research, has rejoined Atlas Mineral as executive vice-president and general manager.

L. W. MOORE, previously associated with the U. S. Rubber Co. in factory and sales capacities for the past 23 years, has been appointed sales manager of the Williams-Bowman Rubber Co., Cicero, Ill.

G. W. NAYLOR, formerly general manager of manufacturing for the Sun Chemical Corporation, has been named manager of the Development Section of the Chemical Division of the Koppers Co., Inc.

J. DUNCAN WEBB, associated with the U. S. Rubber Co. since 1934, has been elected treasurer of the U. S. Rubber Export Co., Ltd., succeeding J. F. SCHNUGG, who retired recently after 36 years of service.

W. F. HINDERSCHEID, assistant to the president of the Lee Rubber & Tire Corp., has been elected vice-president in charge of sales of the wholly-owned subsidiary, the Lee Tire & Rubber Co. of New York.

R. P. ALLISON has been named manager of manufacturing of the Wire and Cable Division, Construction Materials Department, General Electric Co. J. S. OVERSTREET has been named manager of sales for the division.

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Best SHELF and WEATHER *Aging*

SUPER WEAR

BETTER TEAR

COLUMBIAN CARBON COMPANY

500 TONS OF SMOKE A DAY

COLUMBIAN CARBON CO. MANUFACTURER · **BINNEY & SMITH CO.** DISTRIBUTOR

Versatile

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A COLUMBIAN COLLOID

COLUMBIAN CARBON COMPANY

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MANUFACTURER DISTRIBUTOR

NEW POLYMERS AUTHORIZED BY OFFICE OF RUBBER RESERVE, RECONSTRUCTION FINANCE CORPORATION

Listed below are types and properties of new experimental GR-S polymers (including GR-S latices) which have been authorized by the Office of Rubber Reserve, Reconstruction Finance Corporation, since publication of those in our previous issue. Procedures for the distribution and sale of these polymers will be found in our October, 1945, issue. Normally, experimental polymers will be produced only at the request of the consumers and 20 bales (one bale weighs approximately 75 pounds) of the original run will be set aside if possible for distribution to other interested companies for their evaluation. The 20 bales when available will be distributed in quantities of one or two bales upon request to the Sales Division of Rubber Reserve or will be held for six months after the experimental polymer was produced unless otherwise consigned before that time. Subsequent production runs will be made if sufficient requests are received to warrant them.

X Number	*Manufacturing Plant*	*Date of Authorization*	*Polymer Description*
X-506 GR-S	Firestone, Lake Charles	11-22-48	GR-S stabilized with PBNA to be used as the standard reference test sample beginning January 1, 1949.
X-507 GR-S	U. S. Rubber, Borger	12-10-48	A mixture of 55 parts Philblack-O and 100 parts GR-S made at reduced reaction temperature and with cumene hydroperoxide activated recipe emulsified with Dresinate 731. Approximately 3% Marasperse on the black used in slurry make-up. Shortstopped with ditertiarybutyl hydroquinone. Mooney viscosity of latex approximately 50. Antioxidant 1.5% BLE.
X-508 GR-S	U. S. Rubber, Borger	12-17-48	A mixture of 60 parts Philblack-O and 100 parts of continuous process GR-S-10. Mooney of latex approximately 54. Antioxidant 1.5% BLE on the polymer.
X-509 GR-S	Goodyear, Torrance	12-27-48	GR-S made at reduced reaction temperature with cumene hydroperoxide activated recipe emulsified with Dresinate #214. Shortstopped with dinitrochlorobenzene. Mooney 55 ± 5. Antioxidant 1.25% BLE.
X-510 GR-S	U. S. Rubber, Borger	12-22-48	GR-S made at reduced reaction temperature with cumene hydroperoxide activated recipe emulsified with Dresinate #214. Shortstopped with ditertiarybutyl hydroquinone. Mooney approximately 55. Antioxidant 1.25% BLE.
X-511 GR-S	U. S. Rubber, Borger	1-17-49	GR-S made at reduced reaction temperature with cumene hydroperoxide activated recipe emulsified with potassium oleate. Shortstopped with ditertiarybutyl hydroquinone. Mooney 55 ± 5; antioxidant 1.25% BLE. Dilute latex-dilute alum coagulation.

Peninsular Rubber Co. Formed

The Peninsular Rubber Co., Danbury, Ohio, recently incorporated in the state of Ohio, has begun production of mechanical rubber products for the automotive and allied industries. Five hundred shares of no par common stock are to be issued by the corporation. Listed as incorporators are Clifford S. Christiansen, Oliver True and Leslie E. Meyer, all of Port Clinton, Ohio. Mr. Christiansen is president of the new company. It is reported that Peninsular employs a chemical deposition process in the manufacture of its products.

January Consumption Increases

The Rubber Manufacturers Association reports that 49,813 tons of natural rubber were used in January, against 45,644 tons in the previous month, an increase of 9.13%. The use of synthetic rubbers also increased by 6.43% over December, 1948, with 37,513 tons against 35,248 tons. Consumption of reclaimed rubber increased to 21,727 long tons, from 20,122 the previous month. Total natural and synthetic rubber consumed during January amounted to 87,326 tons, compared with 80,892 tons the month before.

Approve I. G. Farben Sentences

General Lucius D. Clay has approved prison sentences of from eighteen months to eight years for thirteen directors of I. G. Farbenindustrie, the German chemical trust. A United States court convicted them of war crimes in July, 1948, the main count being the operation of a synthetic rubber plant at the Nazis' Osweicim concentration camp.

Quaker Industrial Safety Hose

A new kind of industrial wrapped hose that reflects light has been developed by the Quaker Rubber Corp., Philadelphia, Penna. This safety hose helps keep miners and industrial workers from tripping over hose in dimly-lighted areas, the company said. The reflecting feature of the hose is a tough, flexible plastic tape over which is spread a smooth coating of tiny glass beads. The tape is affixed to the outer surface of the hose spirally. Tests have shown that it remains in place as a permanent, integral part of the equipment.

Reduce Mold Lubricant Price

Dow Corning Corporation, Midland, Mich., has announced the fifth reduction in the price of DC Mold Release Emulsion No. 35 and No. 35-A, the latter developed for use in those areas where only hard water is available. Current prices on these lubricants now range from $2.08 a pound in 50-gallon drums, in lots of five or more, to $3.50 a pound in pint containers. The price of 30-gallon drums is $2.18 a pound. Deliveries are f.o.b. shipping point, freight prepaid.

Plan New Chemistry Building

The board of directors of Akron University, Akron, Ohio, has approved plans and specifications for a new million-dollar chemistry hall on the campus. Working drawings for the new building have nearly been completed by Akron Allied Architects. The university expansion program is being financed by money gifts and by a .68 mil levy passed by Akron voters in 1946. The levy runs through 1951.

Forms Process Design Company

Rust Engineering Co., Pittsburgh, Penna. has formed the Rust Process Design Co. to take over the expanding activities of the Process Engineering Division of the parent company. Formation of the new company will facilitate the handling of over-all contracts in the fields of chemical processing and refining work. Walter L. Bass, Dr. John A. Patterson, Leonard A. Wasselle, and Dr. Wendell W. Waterman, all of the Process Engineering Division, have been named as an executive committee to handle the new company. Under the new plan of organization, the Rust Process Design Co. is set up to handle prime contracts for design, engineering and construction particularly in the petro-chemical and organic chemical fields with personnel that is also experienced in conventional and specialized refinery operations and fine chemical processes.

RCA Radio Sues RCA Rubber

The Radio Corporation of America has entered suit in Federal Court, at Cleveland, asking that the RCA Rubber Co., of Akron, Ohio, be forced to stop using that name. The petition said that the public might be deceived into believing that there was a connection between the two companies.

Acquires Atlantic Terra Cotta

General Cable Co. has acquired the Atlantic Terra Cotta Co., which has been in business since 1800. The purchase takes in approximately 10 acres and 100,000 square feet of floor space. The purchase price was reported as $150,000.

FINANCIAL NEWS

EARNINGS OF U. S. RUBBER SET AT $20,141,585 IN 1948

Net earnings of the U. S. Rubber Co. for 1948 amounted to $20,141,585 after taxes and all charges, which is equivalent to 3.5% on sales and $8.48 a share on the common stock, which compares with $21,753,317 or 3.7% of sales and $9.39 a share in 1947.

Consolidated net sales were $572,024,663, a drop of 1.5% from the all-time peak of $580,968,091 reached in 1947. The decrease resulted from lower sales of replacement tires which had been in abnormal demand in the previous year as a result of the accumulated war shortage, the company explained. Sales of all other major products increased in 1948.

Due to improved operating efficiency, profit from the manufacture and sale of products in 1948 rose to $37,534,669, an increase of 4.4% over the previous year, when operating profit was $35,953,503. This advantage was more than offset by a $758,279 loss resulting from the write-down to market of natural rubber inventories, and $862,223 loss caused by devaluation of currency in certain Latin American countries, and the setting aside of $298,252 in profits earned in foreign countries which were not remitted to the United States due to exchange restrictions.

Volume of Production

A substantial volume of production, not reflected in sales to customers, but consumed within the company, was accounted for by the company's rubber plantations, textile mills, chemical and reclaim plants. The value of this production was $93,160,726 in 1948, compared with $90,351,551 in the previous year. In addition, the company produced synthetic rubber valued at $29,000,000 compared with $31,000,00 in 1947.

The company's rubber plantations in Sumatra, which were written off as foreign war losses in 1941 and 1942, were repossessed in December, 1948. Although the political and economic future of Indonesia continues to be obscured by the conflict between the Dutch and the Indonesians, the company repossessed the properties in order to protect possible eventual interest. The investment in the Sumatra plantations at the time of the write-off was $10,023,007. Because of political and economic uncertainties the valuation at the time of recovery was established at $500,000. The company's plantations in Malaya, repossessed in 1946, were in full operation during 1948.

Federal and foreign income taxes in 1948 totaled $14,757,417 compared with $13,725,369 in the previous year. Direct taxes of $61,172,681 were charged against operations compared with $65,349,398 in 1947. The company also forwarded to the government a total of $19,245,910 as income and social security taxes paid by its employees.

Approximately one-half of the sales in 1948 was accounted for by tires. The remainder included a wide variety of products in the fields of rubber, plastics, chemicals and textiles. The company is stressing increased diversification in an effort to increase earnings and provide future stability, the report stated.

Favorable Balance Position

The balance sheet for 1948 showed current assets of $248,027,454 against current liabilities of $75,965,876, giving a net working capital of $172,061,578, compared with current assets of $252,141,343 and current liabilities of $81,988,939, for a net working capital of $170,152,404 at the end of 1947.

A total of $202,544,143 in wages and salaries was paid during 1948 to an average of 64,208 employees, excluding those on rubber plantations, against $208,638,529 paid during 1947 to an average of 66,765 employees. In addition, the company paid retirement allowances of $1,071,301 to 2,078 former employees compared with $951,753 paid in the previous year to 1,964 former employees.

Additions to property and plant, including the Malayan plantations, amounted to $18,358,290. Deductions, including depreciation, disposals and adjustments, totaled $14,722,474, leaving a net increase in property and plant of $3,635,816. Deductions in 1947 were $11,280,390.

Western Electric Co.

For 1948: Net income of $50,847,998, compared with the $32,291,123 earned in 1947. After paying dividends of $36,000,000, or $4 on each of the 9,000,000 authorized and outstanding shares of capital stock, the balance of $14,847,998, added to the $34,185,358 that was in the business at the beginning of 1948, brought the cumulative net income at the end of the year to $49,033,356. The American Telephone & Telegraph Co. owns 8,981,591, or 99.80% of the stock. Sales in 1948 totaled $1,132,972,000, of which $1,022,652,000, or 90%, were to Bell Telephone companies. Sales to other customers included $59,978,000 to the Federal Government.

National Automotive Fibres, Inc.

For 1948: Net profit of $3,140,436, which is equal to $3.29 per share, and which compares with a net profit of $2,107,645, or $2.21 a share, for 1947. Sales for 1948 amounted to $50,025,865, against $43,171,221 the year before. Current assets as of December 31, 1948, were $12,275,505, and current liabilities $2,273,341. At the end of 1947 current assets were $11,651,611, and current liabilities $3,622,737.

GOODRICH REPORTS HIGHEST SALES IN COMPANY HISTORY

Net sales of the B. F. Goodrich Co. last year were the highest in the company's history and earnings were the second best, being exceeded only by those for 1946, according to the annual report issued recently. The record sales of $419,798,703 were 2.3% above the 1947 volume of $410,180,839. Production of synthetic rubber in the Government plant operated by the company is not included in sales for either year.

Net income for 1948 was $23,740,705, after all charges, including estimated foreign and Federal taxes, reduction of raw material inventory and commitments from cost to market, and after providing $4,000,000 reserves for increased replacement cost of facilities and $4,000,000 for possible inventory price declines, foreign losses and other contingencies. The income is equal to $16.57 a share of common stock outstanding. In 1947, the net income was $23,231,063, or $16.18 a common share. Taxes last year, excluding domestic sales tax, amounted to $49,075,000, equal to $37.51 a share of common stock.

The report, signed by David M. Goodrich, chairman, and John L. Collyer, president, emphasized the inadequacy of depreciation allowed for tax purposes during "this period of constantly increasing replacement costs, which range up to four time original cost," and stated that "appropriate charges to income have been made and corresponding reserves established. Previously, these amounts were combined with contingencies, but were set out separately this year because of the increasing significance of the amounts." Capital expenditures for expansion and betterment of manufacturing, distribution and research facilities amounted to $11,726,000, the report notes.

The consolidated balance sheet as of December 31, 1948, shows current assets of $181,201,917, against $165,772,294 a year earlier, and current liabilities of $32,811,965 against $36,821,680. Inventories at the year-end were $99,908,916, compared with $88,940,417 at the end of 1947.

Hewitt-Robins, Inc.

For 1948: Net income of $737,767, which is equal to $2.65 a capital share, compared with $1,223,618, or $4.39 a share, in 1947. Net sales for 1948 amounted to $19,623,002, against $21,609,351 for 1947. Current assets as of December 31, 1948, were $8,882,987, and current liabilities $2,728,333. As of December 31, 1947, current assets were $9,135,520 and current liabilities $3,038,032.

Brown Rubber Co.

For 1948: Net income of $891,492, which is equal to $3.55 a share, compared with $810,890, or $3.23 a share in 1947. The consolidated balance sheet as of December 31, 1948, revealed total current assets of $1,381,417, and total current liabilities of $339,884. As of December 31, 1947, total current assets were $1,333,165, and total current liabilities were $369,560.

GOODYEAR SETS SALES RECORD WITH $704,875,941 IN 1948

The Goodyear Tire and Rubber Co., in its fiftieth year of operations, established a new peacetime sales record of $704,875,941 in 1948, P. W. Litchfield, chairman of the board, reported to stockholders recently. Consolidated net income for the year amounted to $30,595,518. The sales represented a gain of 5% over the $670,772,647 volume for 1947 when earnings totaled $33,044,943.

From the year's net income, an appropriation of $6,500,000 was made for possible loss on foreign investments, leaving a balance of $24,095,518 carried to earned surplus. Net income before this reserve was equivalent to $13.40 per share of common stock, and after the reserve to $10.25 per share.

Comparable net income for 1947, before a reserve of $7,500,000 for foreign investments, amounted to $33,044,943, equivalent to $14.56 per common share, and the balance after reserve to $25,544,943, or $10.93 per share, the report stated. Net income per dollar of sales was lower in 1948. Before appropriations, this amounted to 4.3 cents against 4.9 cents in 1947. After appropriations, net income was equal to 3.4 cents compared with 3.8 cents per dollar of sales in the preceding year.

Goodyear's working capital reached a new high of $256,197,475 at the end of 1948, compared with $243,042,991 the year before, the report said. Current assets were $302,916,927 against current liabilities of $46,719,452, a ratio of 6½ to 1. Cash and U. S. Treasury securities totaled $78,502,984 compared with $78,377,499 at the close of 1947. Inventories of $163,772,003 compared with $149,332,704 a year earlier.

With respect to the company's inventory position, it was explained that all raw materials on hand and the contents of finished inventories are carried on the basis of cost or market, whichever is lower, and by reserves the company has provided for a similar valuation of commitments.

Foreign Subsidiary Income

Goodyear's income from foreign subsidiaries consolidated in the balance sheet amounted to $13,114,000 for 1948. Dividends totaling $7,097,000 were received from these subsidiary companies during the year and remaining earnings were invested in plants and equipment or added to working capital. During the year losses arising from devaluation of currencies in Latin American countries amounted to $1,930,000 and a corresponding amount of the reserves for foreign investments has been utilized to absorb these losses.

Unstable world economic conditions tend to make dollar realization on foreign investments increasingly difficult, the report stated, but the accumulated reserve for this purpose, which amounts to $17,070,000, is believed to be adequate. Total reserves for all purposes now stand at $53,008,329 compared with $45,266,701 at the end of 1947.

Goodyear's capital expenditures during the year for properties and plants amounted to $24,617,428 compared with $35,381,576 in 1947. Mr. Litchfield in his report said that the company has repossessed its rubber manufacturing plant at Buitenzorg, Java, which has been rehabilitated and is operating at capacity. The smaller of two rubber plantations in Sumatra has also been recovered and shipments of crude rubber resumed.

DROP IN SALES AND EARNINGS REPORTED BY GENERAL TIRE CO.

A decline in both sales and earnings for the year ended November 30, 1948, was reported by the General Tire & Rubber Co., in its 33rd annual report to stockholders. Sales for the year dipped to $105,908,203 from $126,136,242 in 1947, a peacetime record. Net earnings for the 1948 fiscal year amounted to $4,783,617, equal to $7.33 per share of common stock. For the fiscal year ended November 30, 1947, net earnings totaled $5,872,472, or $9.08 per share of common stock.

William O'Neil, chairman and president of the company, said the reduction in sales stemmed from the company's decision to discontinue the manufacture and sale of products not closely associated with its normal business activities. This was done, he said, to direct "future capital investment toward expansion and improvement and the future strengthening of our position in our primary field of interest." The company's 1948 net, he said, does not reflect the earnings on the company's share of Mansfield Tire & Rubber Co.'s profit. Nor does it show the increased profits in foreign operations not included in the consolidated statement.

Balance sheet items as of November 31, 1948, reveal current assets of $50,030,828 and current liabilities of $14,536,461. As of November 30, 1947, current liabilities were $17,921,055, and current assets $42,409,458.

Monsanto Chemical Co.

1948: Net income of $18,042,473, which is equal to $3.95 each on 4,274,945 shares of common stock, compared with a net income of $15,263,424, or $3.59 a common share, in 1947. The record net income for 1948 reflects a figure after taxes and all charges including $1,097,195 recovered from insurance companies for loss of profits from the destruction of the Texas City, Texas, plant. Current assets on December 31, 1948, including cash of $10,649,046, U. S. Government securities of $7,018,939, and inventories of $33,587,345, amounted to $69,242,569, while current liabilities totaled $17,292,930. At the end of 1947 current assets were $59,225,283, of which cash was $16,352,101 and inventories $26,154,465, while current liabilities stood at $21,436,559. New facilities constructed during the past 3 years increased the plant account from $70,000,000 to almost $150,000,000.

Raybestos-Manhattan, Inc.

For 1948: Net profit of $2,563,509, or $4.08 a share, against $2,335,755, or $3.72 a share, for 1947. The report represented a preliminary accounting and included domestic subsidiaries of the company.

SEIBERLING NET SALES DROP AS INCOME RISES TO $467,758

Net sales of the Seiberling Rubber Co. dropped 11.5% in 1948 from the preceding year, but net income was up 10.9% over 1947, J. P. Seiberling, president, said in the company's annual report to stockholders released recently. Net sales for 1948 amounted to $28,414,291, compared with $32,116,490 in 1947. Net income was $467,758, compared with 1947 income of $421,614. The year's earnings amounted to 74 cents per common share, compared with 58 cents for 1947, when profits were cut by 6 weeks of strikes, Mr. Seiberling said.

As of December 31, 1948, total current assets were $11,695,768, and liabilities were $3,127,032. Working capital was increased $1,898,676, and at the end of the year was $8,568,736. Additions to plant and property totaled $538,865. Mr. Seiberling said that the increase in working capital and property would permit the company to stabilize employment, make manufacturing and shipping economies, and provide better service to customers.

Mr. Seiberling predicted that industry tire replacement sales for 1949 will be about equal to 1948, but that the demand will grow in an unbroken upward curve until 1953, according to the calculations of rubber industry statisticians. "While continued improvement in the quality of tires could discount such forecasts, it is safe to predict that, with the increased use of automobiles and trucks in the nation, tire and tube consumption will increase steadily after 1949," he said.

Johns-Manville Corporation

Year Ended December 31: Net income of $15,440,475, which is equal to $5.22 a share of common stock, compared with $9,486,633, or $3.23 a share in 1947. Sales for 1948 amounted to $173,458,033, against the previous year's volume, of $133,885,412. The consolidated balance sheet as of December 31 lists current assets of $53,769,838, and liabilities of $18,593,700. A program of expansion, cost reduction, replacement and improvement begun in 1945 was virtually completed by the end of 1948. This program entailed an expenditure of about $53,000,000, of which $15,350,000 was spent in 1948.

United Carbon Company

For 1948: Net income of $3,113,367, which is equal to $3.91 per share, and which compares with $3,159,138, or $3.97 a share in 1947. Net sales for 1948 totaled $26,034,887, against net sales of $23,915,596 in 1947. Balance sheet items for the company and subsidiaries as of December 31, 1948, reveal current assets of $10,470,777 and current liabilities of $3,758,344. At the end of 1947 current assets were $10,669,736 and current liabilities were $2,282,461.

United Elastic Corporation

For 1948: Net income of $1,180,903, which is equal to $7.90 a share, compared with $1,394,761, or $9.33 a share, in 1947.

NEWS IN BRIEF

Latex Distributors, Inc., New York City, is currently offering centrifuged natural latex in tank cars or drums. The company maintains bulking facilities at Baltimore.

National Safety Council, Chicago, has made available its 1949 Directory of Occupational Safety Posters. Consisting of 72 pages, it contains 744 illustrations of safety posters, classified under 15 sections. Copies of the directory are available at 50c each.

The Matador tire plant at Puchov, Slovakia, now in process of construction, is expected to be the third largest plant of its kind in the world. It is patterned after American tire factories.

A technical bulletin on the use of Indonex plasticizers in Butyl mechanical goods has been prepared by the Chemical Products Department of the Standard Oil Co. (Indiana), Chicago. Copies are available on request to the company.

Raybestos-Manhattan has opened a warehouse and office at 314 Occidental Avenue in Seattle, Wash., for the convenience of its customers in the Pacific Northwest. A complete stock of industrial rubber products will be carried.

A large inflated ball, made by Goodyear of neoprene-coated nylon fabric, is being used in a new sport called auto polo. Played with specially-constructed cars, the object of the game is to push the ball with the bumpers of the cars over specified goal lines.

A revised edition of the standards on paper and paper products has been issued by the American Society for Testing Materials. The edition covers 286 pages, contains 77 specifications and test methods, and sells for $2.50 per copy.

The Inspection Department of the Associated Factory Mutual Fire Insurance Companies, Boston, Mass., has changed its name to the Factory Mutual Engineering Division. There was no change in organization or methods.

The first unit of the new $3,000,000 general chemical plant of Goodrich Chemical at Avon Lake, Ohio, will start operating this spring. New plasticizers for vinyl and synthetic resins will be the first products manufactured.

A bulletin describing its new Campbell Soapstone Dispenser has been made available by the Falls Engineering & Machine Co., Cuyahoga Falls, Ohio. General specifications, floor plan, dimensions and export data are given. The bulletin is the first in a series planned by the company describing its various equipment.

Among the special features of the new Goodrich Research Center at Brecksville, Ohio, is the 10,000-volume technical labrary. Some of the periodicals extend back as far as 1788.

A convenient method of filing blue prints and drawings is provided by the Draw-In-Dex cabinet offered by the Empire Development Corp., Washington, D. C. The cabinet measures 20 x 30 inches, is 4 feet high, and accommodates up to 1,000 prints.

The Manhattan Rubber Division of Raybestos-Manhattan, Inc., completed its fifty-fifth year on October 28. The company traces its ancestry to the first chartered rubber company in America, the Roxbury Rubber Co. of Boston.

A handbook on "Radioactivity and Tracer Methodology," probably the most comprehensive work on this subject, is now available from the Office of Technical Services, Department of Commerce, Washington, D. C., at $20.00 a copy.

DuPont Rubber Chemicals Division has prepared a special technical report on neoprene white sidewall tires (Bulletin B1-228). It contains a recommended formulation for neoprene-natural rubber white sidewalls.

Heating panels of conductive rubber for the radiant heating of Chinchilla pens by electricity have been developed by U. S. Rubber. The panels are installed in the ceilings of breeding houses to keep the temperature at an even 70 degrees.

Alpha Corp., Greenwich, Conn., is currently offering Molykote, a new type dry lubricant which consists essentially of molybdenum disulfide powder and has the appearance of graphite, though it contains none. It is said to adhere tenaciously to even the smoothest surfaces with light rubbing.

A technical bulletin on "Indonex in Extruded Mechanical Goods" is available from the Chemical Products Dept., Standard Oil Co. (Indiana), Chicago. Ask for Circular No. 13-29.

The Scottsville, Va., plant of U. S. Rubber was recently presented with the Distinguished Service to Safety Award by the National Safety Council for having operated more than one million man-hours without a lost-time accident.

DuPont has reported that as of December 31, 1948, it was owned by 94,901 different stockholders, an increase of 344 over the number of stockholders recorded at the close of the third quarter of 1948 and an increase of 3,700 over the number of holders as of December 31, 1947.

The Chemists Club, New York 17, N. Y., has issued a commemorative booklet on the 50th anniversary of the organization entitled "Fifty Years of History."

Sponge rubber furnished by Goodrich is protecting the celebrated collection of paintings from the Berlin Museum of Art, which, under the sponsorship of the U. S. Army, is being exhibited about the country.

Firestone recently received two safety honors when its Des Moines, Iowa, plant set a new world's safety record for tire and tube manufacturing plants by completing 3,528,901 man-hours of work without an accident.

A new plastic tubing, known as Temflex 105, approved by Underwriter's Laboratories, Inc., for continuous use at temperatures up to 105° C., has been announced by the Irvington Varnish & Insulator Co., Irvington, N. J.

The latest bulletin issued by Foster D. Snell, Inc., New York City, covers surface activity and detergency. The bulletin outlines forms of research and services offered by the company on surface active properties.

The Midwest Research Institute, Kansas City, Mo., has issued a report covering its activities during 1948. Specific progress made by each of its four major divisions is covered.

Reinhold Publishing Corp., New York City, has issued the 1949 edition of its catalog of technical books, including all of the A.C.S. monographs published by the company. Copies are free on request.

The third edition of its catalog on hydrocarbons has been issued by the Chemical Products Department, Phillips Petroleum Co., Bartlesville, Oklahoma. Physical data and technical information have been examined and revised to provide the most recent information available.

Corlon tile, made of a chemically reacted combination of plastics, developed for the top-end of the floor covering market, has been introduced by Armstrong Cork. It is being supplied in ten colors and in four sizes, all in one-eighth inch gauge.

The value of U. S. exports of rubber, allied gums, and manufactures during November, 1948, amounted to $6,833,113, the lowest figure in many months, the Department of Commerce announced recently.

General Electric has developed a new group of wood flour phenolic molding compounds for use in wiring devices and certain other products for the home.

Commercial production of American Montan wax has been announced by the American Lignite Products Co., the Western Division of the DeAngelis Coal Co.

CONNECTICUT HEARS ADDRESS ON PROCESSING OF NEOPRENE

A talk on the "Processing Characteristics of Neoprene" by N. L. Catton of the Rubber Laboratory, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., featured the Winter Meeting of the Connecticut Rubber Group, held at the Hotel Barnum in Bridgeport, Conn., on February 11. Over 100 members and guests were present, marking the largest attendance of the group to date. In addition to the talk, special entertainment was provided by Michael MacDougall, known as "The Card Detective," whose antics were well received.

The meeting was opened by Chairman Stuart M. Boyd (U. S. Rubber) who called upon John Ingmanson (Whitney Blake) as a representative of the Rubber Division, A.C.S. Mr. Ingmanson explained the standing of the local groups under Division sponsorship. It was then announced that the next meeting of the Connecticut group would be held on May 13 in New Haven and that an outing would be held on either September 10 or 17, under the chairmanship of Tom Skipp (U. S. Rubber, Naugatuck). Al Simon (H. O. Canfield) was then called upon to introduce Mr. Catton, a college classmate of his.

In his talk, Mr. Catton described in detail the properties of neoprene and the factory handling of the two general purpose types, GN and GN-A. He described a new member of this group, Neoprene Type RT, stating that it possessed comparable raw stock stability and curing characteristics to Type GN-A, but that unlike GN and GN-A it does not freeze and become leathery in the uncured state. The new type neoprene, he said, is non-discoloring and therefore can be substituted for Type GN in all light colored products.

Mr. Catton presented data demonstrating the effects of warehouse storage on plasticity, scorch and curing characteristics of the three general-purpose types of neoprene now available. The data indicated that while Type GN exhibited some instability in respect to these characteristics, one year's warehouse storage resulted in very little change in Types GN-A and RT. He also discussed some interesting data covering the use of Para-Flux as a means of retarding uncured stock freezing and crystallization.

The best conditions for breakdown of neoprene, according to the speaker, are on a cold mill in the absence of chemical plasticizers. The importance of proper mixing and its very beneficial effect on subsequent processing operations, such as tubing and calendering, was emphasized. In concluding, Mr. Catton described the use of Neoprene Type S as a means of overcoming the softness imparted by high concentrations of plasticizers.

(EDITOR'S NOTE: Mr. Catton's paper will be published in full in an early issue of RUBBER AGE).

The New York Regional Office of the U. S. Department of Commerce has been moved from the Empire State Building to new quarters at 42 Broadway. The new telephone number is DIgby 4-8000.

POLSON AND WEATHERFORD JOIN GOODYEAR CHEMICAL DIVISION

J. A. Weatherford

A. E. Polson

Two additional appointments to the Chemical Division of the Goodyear Tire & Rubber Co. were recently announced with the naming of J. A. Weatherford as special sales representative and A. E. Polson as technical representative. Mr. Weatherford has been associated with Goodyear since 1942, and has had wide experience with vinyl resins, rubber and resinous latices, paint and rubber compounding. A native of Chilton, Ky., Mr. Weatherford was graduated from Kent State University in 1938 and received his master's degree in chemical engineering from Ohio State University in 1939. He will establish his headquarters in Chicago, Ill. Mr. Polson, who will have headquarters for the time being in Akron, joined the Goodyear organization as a graduate of the University of Minnesota with seven years' experience in vinyl resins, cellulose derivatives, fluorinated resins, alkyds, nylon and impregnated fabrics. He is a member of the American Institute of Chemical Engineering, the American Chemical Society, and Alpha Chi Sigma fraternity.

Compressibility Factors Data

A set of charts of compressibility factors for hydrogen, nitrogen, and oxygen, together with charts showing quantities of these gases delivered by commercial cylinders, has been published by the National Bureau of Standards. This set of six charts should prove of interest to anyone who either uses or handles any of these three gases. The data is contained in Miscellaneous Publication No. M-191, entitled "Charts of Compressibility Factors and Charts Showing Quantities Delivered by Commercial Cylinders for Hydrogen, Nitrogen, and Oxygen," by Messrs. Hoge, Meyers and McCoskey, which is available from the Superintendent of Documents, Washington 25, D. C., at 25c.

Britain Sets Tire Record

G. E. Beharrel, president of the British Tire Manufacturers' Conference, recently announced in London that Great Britain had made more than 10,000,000 tires for export last year. The 1948 total established a record and was 3,000,000 more than had been produced in 1947. Mr. Beharrel said that Britain had equipped more than $500,000,000 worth of motor vehicles, airplanes, motorcycles and bicycles sent overseas, and shipped about $50,000,000 worth of tires and tubes direct.

New Service Entrance Cable

U. S. Rubber Co. has developed a new long-wearing service entrance cable for carrying electricity from main power lines to homes, offices and industrial buildings. The new cable, because of a natural rubber insulation around its conductors and an outside jacket made of neoprene; is said to wear four to five times longer than the conventional braided types. The neoprene jacket will eliminate "festooning," the separation of the outside braid from the cable, which occurs in the conventional types, and also gives the cable high resistance to rain, ice and sleet, and deterioration by sunlight. The cable is approximately one-quarter inch smaller in over-all diameter than braided types which will mean a smaller ice and wind load.

New Weather Exposure Station

Sam Tour & Co., Inc., 44 Trinity Place, New York 6, N. Y., has established an out-of-doors testing station in Miami, Fla., which is said to provide the maximum of exposure to the sun's rays for weather testing of materials and products. At their laboratories in New York, facilities are maintained for both outside and inside weather testing. Interpretation of reports on all weather tests in New York and Miami are made by the engineering staff at the laboratories in New York.

OBITUARIES

Eric Burkman

Eric Burkman, secretary of the U. S. Rubber Co., died on February 26 while on vacation in St. Thomas, Virgin Islands. He was 56 years old. Born in Elizabeth, N. J., Mr. Burkman began his business career in 1906 in the general stores department of the Central Railroad of N. J., while a student at Elizabeth High School. In 1912 Mr. Burkman entered the office of the director of purchases of the Union Pacific-Southern Pacific System in New York. The next year he was transferred to the accounting department, and later he was assigned to the office of Charles B. Segar, then vice-president and controller of the system. When Mr. Segar was elected president of U. S. Rubber in 1919, Mr. Burkman was appointed secretary of the operating council. Three years later he was made assistant to the president, continuing in that capacity until 1929 when F. B. Davis, Jr., was elected president. Mr. Burkman then became secretary of the company. He was also secretary of the finance and executive committees and secretary or a director of most of the company's subsidiaries. He served on the firm's insurance committee, the public relations policy committee and the board of benefits and awards. Mr. Burkman was a member of the Elizabeth Town and Country Club and the Baltusrol Golf Club, Springfield, N. J. His wife and two daughters survive.

John Stead

John Stead, vice-president of the Binney & Smith Co., died on February 18 in St. Luke's Hospital in New York City after an illness of six weeks. He was 63 years old. Mr. Stead, who had been with Binney & Smith for 45 years, was a member of the board of directors and was in charge of production at all factories of the company. He was past president of the Delaware Valley Area Council, Boy Scouts of America, a Mason and an Elk. He was also past president of the Easton, Penna., Board of Trade and was an elector to the Electoral College in 1948. For many years Mr. Stead had extensive interests in Florida. He was president of the St. Lucie County Bank, Fort Pierce, Fla.; president of the Indian River Refrigerator Terminal Co., and president of the Fort Pierce Financing and Construction Co. His wife and daughter survive.

Arthur C. Kingston

Arthur C. Kingston, retired vice-president and general manager of the Boston Woven Hose & Rubber Co., Cambridge, Mass., died at his home in Belmont, Mass., on February 6. He was 72 years old and had been in retirement for the past 4 years.

Kirk Brown

Kirk Brown, one of the founders of the Dunlop Rubber Co. of America, and credited with being among the first to introduce pneumatic tires in the United States, died on February 13 at his winter home in Bradentown, Fla. Born in Philadelphia, Penna., Mr. Brown was a resident of Montclair, N. J. He was also an organizer of the Bakelite Corp., now a unit of the Union Carbide and Carbon Corp. Prior to World War I, Mr. Brown organized the Condensite Co. of America at Glen Ridge, N. J., which later became a part of the Bakelite Company. Mr. Brown's interests in the rubber company stemmed from his activities with the Century Wheelman Club, a cycling organization he helped found. He was also the first president of the Automobile Club of N. J., a forerunner of the Automobile Association of America. Mr. Brown retired from active business life a few years ago. He joined the New Jersey Taxpayers Association and helped to promote revision of the New Jersey Constitution. He recently received an award from the association for his efforts in promoting better state and municipal government. He leaves three sons.

Abraham Shapiro

Abraham Shapiro, president of the Gold Seal Rubber Co., Boston, Mass., and a director of the Goodyear Rubber Co., Middletown, Conn., and the Cannon Shoe Co., Baltimore, Md., died while on a vacation at Hollywood, Fla., at the age of 65. Born in Lithuania, he resided in South Africa before coming to the United States nearly forty years ago. Mr. Shapiro was one of several Boston men who contributed generously towards the founding of Brandeis University, first Jewish-sponsored institution of its type. He was named its first honorary alumnus. He also had been a benefactor of Tufts College Medical School, Boston University, Northeastern University and the New England Medical Center. He was the founder and an honorary life member of the "210 Associates," the shoe industry's national charitable organization, and a trustee of the combined Jewish Appeal of Greater Boston and Associated Jewish Philanthropies of Boston, and vice-president of Beth Israel Hospital. His wife, four sons and four daughters survive.

L. G. Chauvin

L. G. Chauvin, general manager of the Stedfast Rubber Co. (Canada) Ltd., Granby, Quebec, died on February 23 as the result of a heart attack. He was 68 years old. Mr. Chauvin had been associated with Stedfast since November, 1940. Previously, he had been employed by the F. S. Carr Co., Framingham, Mass., and the Federal Leather Co., Newark, N. J.

Philip Lieberman

Philip Lieberman, associated with H. Muehlstein & Co., Inc., since 1918, died as a result of injuries sustained in a railway accident while on a recent business

trip through Spain. Mr. Lieberman was born in New York City in 1902. He had worked his way through the various divisions and branches of the organization to his last position handling export sales. The body was returned to New York for interment. His wife and three daughters survive.

William H. Klein

William Henry Klein, production manager of the Congoleum-Nairn Co., Kearny, N. J., died on January 28 at his home in Maplewood, N. J., after a long illness. He was 55 years old. Mr. Klein joined the firm as a bookkeeper in 1912 and had been production manager since 1929.

Plan Distillation Plant

Plans for the erection of a new $1,000,000 distillation plant on a 5-acre site near West Elizabeth, Pa., have been announced by the Pennsylvania Industrial Chemical Corp., Clairton, Pa. In about six months the firm expects to complete the installation of an entire distillation unit for the separation of precision fractions of aromatic oils, one of the initial processes in the development of resins. These resins are used on rubber, textile, floor covering, paint and varnish, adhesive, paper and other industries.

Latex Research Organization

Extensive facilities for experimentation with fresh Hevea latex are being offered to companies which have no laboratories in latex-producing countries by the Chemical Development Centre, G.P.O. Box 106, Singapore, Malaya. A private research organization, it is offering its services on a reasonable fee basis.

LOS ANGELES NEWS

J. Brendon Brady, general manager of the Pacific Division of U. S. Rubber, was honored at a dinner on February 10 in the Fairmont Hotel, San Francisco, on the occasion of his retirement from the company. Mr. Brady, a native of New York City, had been associated with U. S. Rubber for 39 years. He began his career as a salesman in Chelsea, Mass. One year later he was sent to San Francisco as a sales executive, and he remained there until the date of his retirement.

T. B. Squires, formerly with the Pioneer Rubber Mills at Pittsburgh, Calif., is now associated with the Aetna Manufacturing Co. in Burlingame, Calif.

W. A. Moore, associated with the rubber industry for many years, including a connection with the Gates Rubber Co., has leased the plant of the Bell Rubber Co. in Dallas, Texas, in association with J. R. Mitchell. They plan on manufacturing oil field products.

William "Bill" Moser, who recently joined the Kirkhill Rubber Co., has been named factory manager.

G. A. Zimmerman, formerly with the Barney Bristow Manufacturing Co. in San Carlos, is now associated with the Flex Firm Co. in El Monte.

The National Spring Cushion Co. has been formed at 2020 Laura Ave., Huntington Park, for the manufacture of molded sponge parts. For the time being, the company will have its mixing done on the outside but will do its own molding, trimming, etc.

Harry Arbogast, who joined the West American Rubber Co. recently, has replaced Roy Wannamaker as superintendent. Mr. Wannamaker is now associated with the Thermoid Co. at Nephi, Utah.

A display of the natural resources of the eleven Western states will be a feature of the Pacific Chemical Exposition to be held in the San Francisco Civic Auditorium from November 1 to 5. Letters have been sent to the governors of these states offering free exhibit space and inviting each state to install an educational exhibit. James O. Clayton, of the California Research Corp., is chairman of the Exposition Committee.

The Fisk tires division of the U. S. Rubber Co. will establish a Pacific Coast division comprising the area of the Los Angeles and Portland sales districts. C. J. Morgan, formerly Fisk district manager for New York, has been appointed Pacific Coast divisional manager, with headquarters at Los Angeles. Mr. Morgan has been in the tire field since 1926 and has been with Fisk since 1938.

Goodyear Improved Stamping Gum

Development of a new gray and a new red stamping gum, for use in making signature stamps of all kinds, has been announced by the Goodyear Tire & Rubber Co. Improvements in the new stamping gums include an increased aging quality over previous gums and a very low gravity which permits more stamps to be made from each pound than formerly, the company said. The new product is to be used with clay or plastic molds and will cure in from five to eight minutes, depending upon the amount of steam pressure applied in the mold.

Current officers of the Los Angeles Rubber Group are pictured above. BACK ROW (left to right)—Carl S. Hoglund, Deke Maddy, Phil Drew and Robert Short (all directors). FRONT ROW (left to right)—R. Abbott, Vice-Chairman; E. C. McLaughlin, Associate Chairman; Charles Churchill, Chairman; L. E. Budnick, Treasurer, and A. J. Hawkins, Jr., Secretary.

Represents Ceylon Rubber Co.

Andre Burnett, head of the Burnett Co., 225 Lafayette St., New York 12, N. Y., has been named exclusive agent in the United States and Canada for the Ceylon Produce & Rubber Co., producers of natural rubber and sole crepe, with headquarters at Colombo, Ceylon. Born and educated in England, Mr. Burnett was chief chemist of the Premier Rubber Co. of Manchester for several years. Coming to this country later, he organized production for the Kinzie Rubber Co., of Chicago, but returned to England to serve in World War I. Returning to this country after the war he became factory manager of the Chicago Rubber Clothing Co. and later president and general manager of the Marathon Rubber Products Co. In more recent years, Mr. Burnett has been European representative of the Pequanoc Rubber Co., with headquarters in London. Since returning to the United States in 1947 he has operated the Burnett Co. as an import-export concern.

Lane Heads Atlas Electric

John W. Lane, who acquired control of the Atlas Electric Devices Co. of Chicago from the Jameson interests last June, was recently elected president of that company. Atlas Electric manufactures the well known and widely used Atlas-Ometers for weathering and fading tests on rubber and other products. Mr. Lane is a graduate of Brown University, Class of 1931, and took a post-graduate course at M.I.T. He holds an M.E. degree. For some ten years, he was associated with the A. B. Dick Co. in an engineering capacity, and also spent a year with a pharmaceutical concern in New York. L. J. Schrachta, sales manager, and Joseph E. Norton, director of research, still occupy those posts with the company. C. W. Jameson, formerly president, has retired from active business, but is available to Atlas Electric in a consulting capacity.

Buckeye Changes Corporate Name

The corporate name of the Buckeye Reliner Producing Co., 635 N. Jackson St., Lima, Ohio, has been changed to Buckeye Rubber Products, Inc. There has been no change in management, personnel, and organization. The business, policies and assets of the corporation remain the same. The company was originally organized in 1914 for the manufacture of patches and tire reliners. The company no longer produces these items, but has extended its sphere in the rubber industry to include rubber items in the automotive and industrial fields. The change in corporate name was brought about, company officials said, by the realization that the original company name was misleading to the trade.

"Look, Listen and Live!" is the title of a new booklet recently published by the Union Pacific Railroad in an endeavor to cut down grade-crossing accidents.

CANADIAN NEWS

Retailers attending the recent C.S.R.A. annual meeting voted unanimously in favor of a resolution directing the executive committee to set up a national committee to make a thorough study of the rubber footwear discount situation. The new committee will consist of three or four members located close enough to each other to meet regularly but it will also organize sub-committees all across the country.

In his annual report, Executive Vice-President Fred M. Payne pointed out that previous resolutions "deploring" the discount system now in effect had not produced any results whatever. This was chiefly due to the fact that there is no organized footwear group within the Rubber Association of Canada. An informal committee is reported to meet occasionally but its chairman has always explained that it was in no position to give consideration to such broad subjects.

The new committee will base much of its activities on the results from a questionnaire which is to be sent out to the C.S.R.A. membership to gather facts from all types of stores and departments, and to get a completely national picture of the situation.

Business readjustment in Canada may be less difficult than in the United States in the opinion of W. H. Funston, president of the Firestone Tire and Rubber Co. of Canada. Mr. Funston addressed the Toronto Automotive Trade Association at its annual meeting recently.

Mr. Funston warned, however, there was no reason for complacency on the part of business men. "A realistic look into the future provides no justification for such an attitude," he said, "We face more trying conditions than we recently have had, and we are going to have to fight hard in competitive markets.

"The time is here when business must fight harder for sales, offer better values, be more aggressive, maintain a much closer watch on expenses, and in general, tighten up the whole operation with a view to holding profits, employment and general activity at as high a level as possible."

"Salesmen are made—not born," Ira Needles, vice-president and general sales manager of the B. F. Goodrich Rubber Co. told the Montreal Shoe Co. club at the Mount Royal Hotel in Montreal recently.

Speaking on the "Romantic Story of Rubber," Mr. Needles outlined the development of rubber manufacture and then warned his audience of the necessity for training and retraining in sales procedures. Competition lagged during the war years, he said, and some of the training experience in aggressive sales thinking, planning and action has been lost.

Salesmanship, he said, should properly be rated as a profession—a most important profession. Salesmanship can be taught, it can be learned, and the level of ability to sell merchandise can be stepped up in any organization.

Predicts Increased Latex Use

A 33% increase in the use of natural rubber latex in 1949 over the 25,000 long ton consumption last year, was predicted recently by Dr. R. P. Dinsmore, vice-president in charge of research and development of the Goodyear Tire & Rubber Co. Dr. Dinsmore said the industry's increased use of raw liquid latex to approximately 34,000 long tons would be largely due to the greatly increased use of foamed latex cushioning for mattresses, furniture and transportation seating material. Goodyear, in anticipation of the demand for this type of material, during the past year placed a new $5,000,000 Airfoam cushioning plant in operation at Akron. A new creaming plant to prepare liquid latex for the journey to the United States has been placed in operation in the Malayan state of Johore.

Assume Philblack Sales

The Phillips Chemical Co. has, effective January 1, 1949, assumed the sales of Philblack A and Philblack O which have formerly been manufactured by that company and sold by the Phillips Petroleum Co. Consequently, all sales and service work in connection with Philblack will be handled by Phillips Chemical Co., a subsidiary of Phillips Petroleum Co. The personnel of the Philblack sales and service organization remains unchanged. Correspondence and purchase orders should now be sent to the Philblack Sales Division, Phillips Chemical Co., 605 Evans Building, Akron 8, Ohio.

Harold DeWitt Smith Medal

As a testimonial to the late Dr. Harold DeWitt Smith, who died in February, 1947, a Harold DeWitt Smith Memorial Medal is to be awarded annually for outstanding achievements in the field of textile fiber utilization by Committee D-13 on Textile Materials of the American Society for Testing Materials. Dr. Smith was widely known for the number, variety and importance of his contributions to the advancement of the textile industry. The testimonial has been made possible through an arrangement with the Fabric Research Laboratories of Boston, Mass., who have sponsored the award.

Review of Analytical Chemistry

The first of a series of annual reviews of developments in analytical chemistry appears in the January and February, 1949, issues of *Analytical Chemistry*, official journal of the American Chemical Society. This first series covers 40 separate reviews, touching on every phase and branch of analytical chemistry. The article covering analytical methods pertaining to natural and synthetic rubbers was prepared by Norman Bekkedahl and Robert D. Stiehler, both of the National Bureau of Standards, Washington, D. C. In order to include practically all of the publications in the relatively new field of synthetic rubber, the article covers the period from 1944 to the present. It includes 245 separate references. Anticipating demand, A.C.S. is preparing a combined reprint of the January and February reviews. The reprints will be available from the Reprint Department, American Chemical Society, 1155 Sixteenth St., N.W., Washington 6, D. C. Price is $1.50 per copy.

Goodrich Shifts Personnel

Several supervisory changes brought on by the appointment of a new production superintendent at the Oaks, Penna., plant, have been announced by the B. F. Goodrich Co. Fred N. Lehmann has been made Oaks production superintendent succeeding Howard J. Korsmo who has been transferred to a special foreign assignment. Mr. Lehmann was manager of industrial engineering in the tire division at Akron for the last several years. Robert W. Smith, previously a process engineer in the tire division on rubber track development, has replaced Mr. Lehmann. Warwick McCutcheon, formerly night shift superintendent in the Akron tire division, succeeds Mr. Smith as process engineer. Palmer O. Brekke, previously a foreman in the tire division, has been appointed new night superintendent at the Oaks plant.

Universal Seven-Seas Corp.

The Universal Seven-Seas Corp., 37 Wall St., New York 5, N. Y., was recently formed for the export and import of general merchandise including rubber, chemicals, cotton, and other products. Dr. Edward Ewing Pratt, former Acting Secretary of the Department of Commerce, is chairman of the board of the company which was incorporated under the laws of New York State. Harper Wang, general manager of the Universal Import & Export Co., Shanghai, China, is president of the company.

Advancements at Richards Co.

H. N. Richards Co., Trenton, N. J., sales agents, has announced the election of Charles M. Hellyer as vice-president of the organization. At the same time, Rosetta E. Engel was elected assistant treasurer and Francis G. Mendry, assistant secretary of the company. Douglas S. Dilts is president of the company.

THE STORY BEHIND THE WORD...

CURFEW...

Our word "curfew," an order to clear the streets and retire for the night, stems from the time of the Norman Conquest of England. The Normans, warlike descendants of the Vikings, would prepare their camps for the night at the command "covre feu" which meant, in old Normandy French, "cover the fire."

The word Muehlstein—First Name in Scrap Rubber—has long meant strength, stability and progressive leadership.

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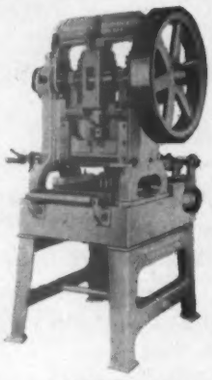
1. MODEL A 1—cutting Heels at high speed production or short runs.

2. Model A 2—cutting Multiple Heels, Half and Full Soles with stock grain.

3. Model A 3—cutting Multiple Heels and Taps with or across stock grain.

4. MODEL A2s (Not illustrated) —cutting cross grain of stock.



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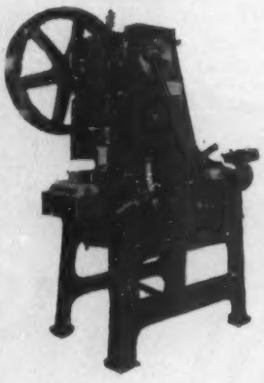
MODEL A1



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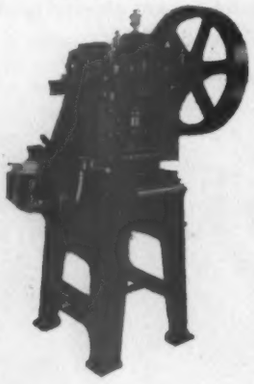

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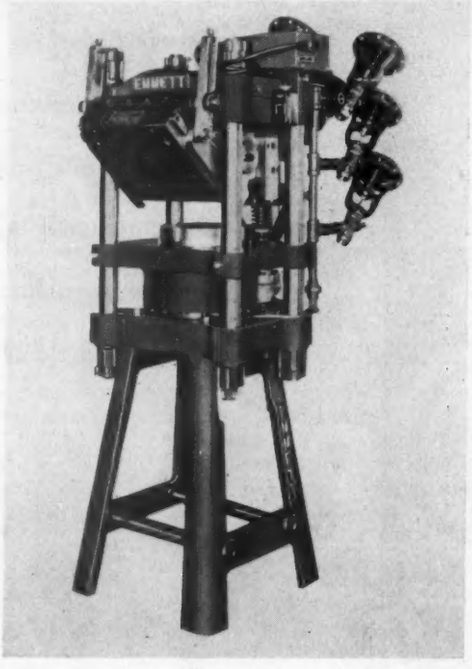
NEW EQUIPMENT

Merit Tilting-Head Hydraulic Press

The availability of a new Merit line of tilting-head hydraulic presses, featuring rapid operation and positive safety devices, has been announced by Emmett Machine & Manufacturing, Inc., 2249 Fourteenth St., Akron 14, Ohio. Merit Model No. E-113, shown in the accompanying illustration, is available in two sizes having platens of either 14 x 14 inches or 24 x 24 inches. They have



been designed for applications requiring high-speed operation, accuracy of mold register, convenience of loading, and ease of stripping molded products from press. Heated platens can be supplied upon request. Construction features include bronze bushing guides on lower platen; annealed steel ram, cylinder and head casting; and completely self-contained packing cartridge which can be removed quickly and easily for replacement or maintenance.

Operating speed of the Model E-113 is 3 seconds, including opening or closing of mold and tilting of head. The small press is stressed for a maximum pressure of 3000 psi (124 ton maximum) and the large press for a pressure of 2500 psi (284 ton maximum). Pull-back operation is accomplished by means of a telescopic ram located inside main ram. Daylight opening on both presses is made to specification. Normal stroke is 2½ or 6 inches in the 14 x 14 size, and 8 inches in the 24 x 24 size. The presses can be furnished complete with self-contained Merit hydraulic power unit, valves, controls, and safety interlocks. Special models are available equipped with integrally-mounted automatic processing control unit which provides for simple pushbutton operation.

Heavy-duty Mills, in all sizes up to 84 inches, featuring extra heavy construction, smooth operation, and long life.
Laboratory Mills furnished with built-in motor, control and adjustable speed drive. Entirely enclosed ready to operate. Mechanism is easily accessible.
QUICK PROFITS
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DELIVERY
42—ton Laboratory Presses, entirely self-contained, equipped with 12"x12" platens, occupying floor space of only 14"x26". Has adjustable opening.
Presses for compression, transfer molding, laminating, and polishing. All sizes and types. Custom built.

TO INCREASE PRODUCTION — and therefore profits — you should choose EEMCO. Here is a line made in a factory with more than 30 years experience in Rubber and Plastic machinery. EEMCO operates its own modern foundry and machine shop, and has every facility including a large stock of motors, controls, and necessary component parts to insure quick delivery. Choose EEMCO for correct design and sturdy dependability. Built for heavy duty and long life, EEMCO saves time and money. Currently, EEMCO is making exceptionally fast deliveries. Write today for quotations.

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RUBBER AND PLASTICS MACHINERY DIVISION

DC Silicone News

Increased Volume Cuts Cost of Silastic*

Design engineers weigh the properties and service life of a material against its price per pound. Sometimes there is only one material that will serve the purpose and price becomes relatively unimportant. That has been true of Silastic, the Dow Corning Silicone Rubber. But this initial market for Silastic has now become large enough to permit more efficient production and the opening of new markets through a price reduction of 20 to 45 cents a pound.

Silastic tubing reinforced with glass cloth is used to seal heating and ventilating ducts operating at 350-400° F. in Consolidated's Vultee Convair-Liner; in jet type planes at temperatures of 350-450° F. and under pressures up to 150 p.s.i.

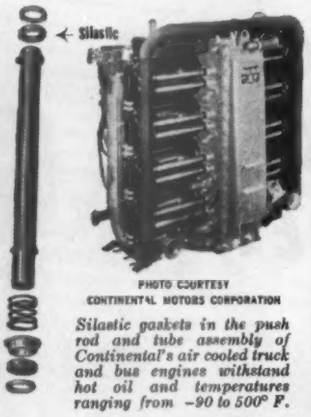

PHOTO COURTESY CONTINENTAL MOTORS CORPORATION

Silastic gaskets in the push rod and tube assembly of Continental's air cooled truck and bus engines withstand hot oil and temperatures ranging from −90 to 500° F.

In the aircraft industry Silastic found a good initial market because it is the only resilient material that withstands hot oil and both high and low temperatures. Typical uses are: sealing thermal anti-icing systems; gasketing engine rocker boxes; and flexible heating ducts.

In the automotive industry gaskets are only one of the many applications for Silastic now under test.

Only Silastic is serviceable at temperatures in the range of −70° to −150° F. and upward of 500° F. It also has exceptional resistance to weathering and to many chemicals, excellent dielectric properties and water repellency. For more information phone our nearest branch office or write for pamphlet No. F5-V-2.

*TRADEMARK REG. U.S. PAT. OFF.

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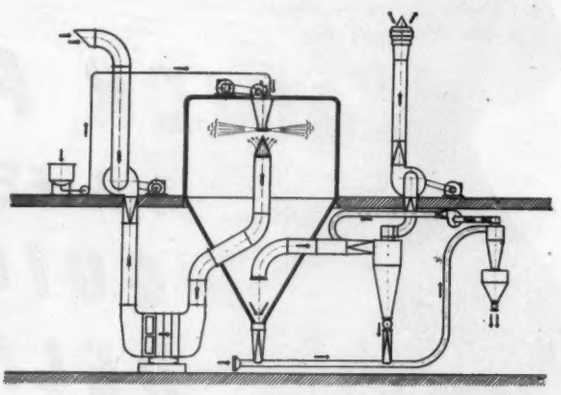
Niro Spray Drying Equipment

Rights to the manufacture and sale of the internationally-known spray drying equipment featured by the Danish firm of Niro Atomizer, Ltd., were recently secured by the Niro Corporation, an American firm with headquarters at 52 Broadway, New York 4, N. Y. The American concern will work closely with the Danish organization on the manufacture and installation of the equipment.

Because of numerous features, including much quicker and less harsh drying, the number of industries using spray drying methods has increased considerably



in recent years. According to Niro engineers, the spray drying of latex should prove of considerable interest since it gives a considerably higher rubber yield and strength than the coagulation method generally employed. Furthermore, it finds application in the manufacture of synthetic rubber because it prevents overpolymerization frequently caused by heating, especially in the case of emulsion polymarization.

Outstanding feature of the Niro method is the atomizer head, the action of which is indicated in the accompanying sketch of a typical installation. It is a specially designed, high-speed rotary head which ejects the liquid product as a mist into the drying chamber. Circulating hot air seizes the mist as it enters the chamber and instantaneously evaporates its water content. The dry content falls to the bottom of the chamber as a fine powder and is funnelled out as a finished, easily soluble product.

The high speeds attained by the atomizer head and its special design are principally responsible for the efficiency and wide acceptance of this unit. The atomizer produces a consistently uniform powder and the drying is accomplished at a temperature so low that the original properties of the product are in no way impaired. An outstanding feature of this equipment is its ability to produce powders with very high bulk densities when it is required.

Reliable, trouble-free operation is a result of the equipment's two-stage design, the company states. Pipes, ducts or other parts of the system do not clog even when drying viscous substances of pasty structure or under other severe working conditions. Moreover, operation of a Niro installation, while continuous, requires a minimum amount of attention. One person can handle an entire plant.

ENGRAVED MOLDS WITHOUT SIZE LIMIT

are now practical . . . at low cost

IF IT were not for the heavy duty engraving machines designed and built by BRIDGWATER, engraved steel or iron molds for giant "off-the-road" tires would be prohibitively costly . . . if not impossible to make.

With these precision engraving machines we can engrave molds of cross sectional widths up to 27", with outside diameters over 100", and more important, with an outside tread radius of up to 30" . . . and at a cost, often less, and certainly no greater, than cast aluminum molds.

This development by BRIDGWATER of a means to extend the recognized advantages of engraved steel or iron molds to the manufacture of giant size tires is just another example of our determination to make molds of whatever characteristics the tire industry requires . . . at the lowest possible cost.

THE BRIDGWATER MACHINE COMPANY

Akron, Ohio

FOR BETTER MOLDS FOR BETTER TIRES *SPECIFY* BRIDGWATER

Weathering qualities of
RUBBER PRODUCTS
determined with reliable
accuracy in the

ATLAS *twin arc*
WEATHER-OMETER

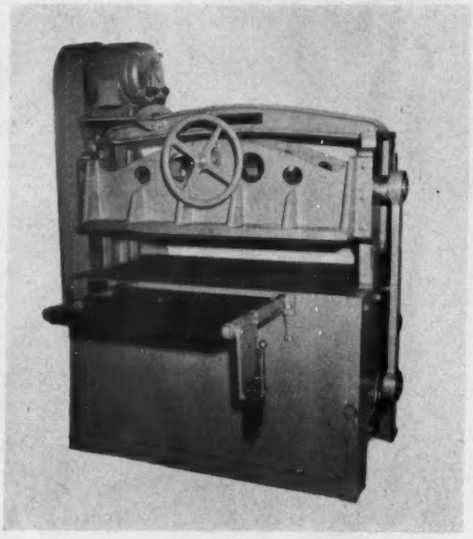
Any selected cycle of exposure to sunlight and wetting can be set for automatic continuous testing in the Weather-Ometer. Exact tests can be duplicated at any time by settings on the control panel which contains temperature regulator—time meter—light and water cycle switch — automatic cut-off switch — voltage adjusting switch — direct reading thermal regulator — reactance coil (for economical current consumption). The Weather-Ometer is fully automatic in operation; can be left unattended over night; only necessary to renew carbons once in 24 hours. Years of exposure to any conditions of weathering reduced to a few days testing in the laboratory with the Weather-Ometer.

Originators and sole manufacturers of accelerated testing machines for over a quarter of a century. Fade-Ometer, Weather-Ometer, Launder-Ometer — the accepted standard testing machines used all over the world.

ATLAS ELECTRIC DEVICES CO.
361 West Superior Street, Chicago 10, Illinois

Heavy-Duty Die Cutting Press

A completely new hydraulically-operated, remote control, 60-inch heavy-duty die cutting press was recently introduced by the Standard Machinery Co., Mystic, Conn. Described as a versatile machine, now being used in the manufacture of rubber, paper and other products, finger tip pressure permits the operator to



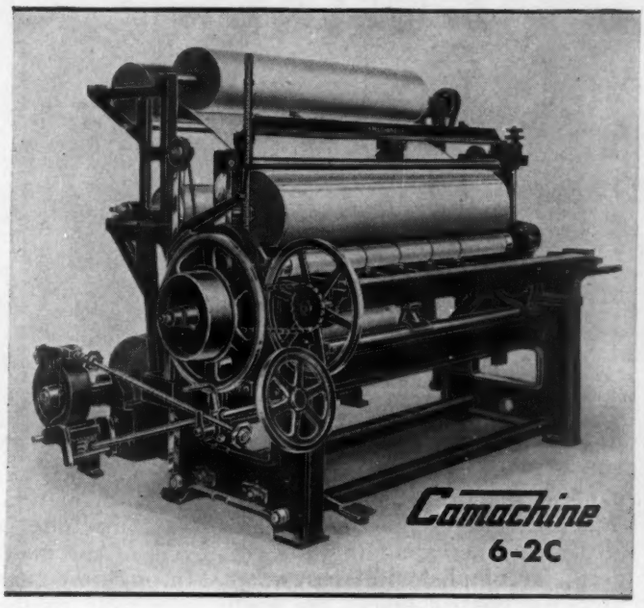
move an hydraulic operated lever, which is conveniently located alongside the front roll. The lever operates the friction disc clutch and a large rugged brake. With complete lever control of the press at all times, the operator can easily jog the head in up and down positions, or operate the machine continuously or intermittently. Compact, sturdily built, and completely safe (all moving parts, except the head, are enclosed), the new die cutting press is capable of operating at 15 strokes per minute. The oversize clutch and brake permit instantaneous start and stop operation. The unit is 34 inches by 60 inches in size.

New Type Die Transfer Table

A problem in transferring dies from a press having an extended base to a die handling table has been solved by the use of a hydraulic elevating table having an overhanging top, counterweighted to provide proper balance when handling dies weighing up to 300 pounds. The table, manufactured by the Lyon-Raymond Corp., Greene, N. Y., is furnished with the overhanging section 14 inches wide by 24 inches long. This section serves to bridge the gap caused by the press base extension. The extension can either be removed completely or tilted up to swing 10° back of the vertical position when not in use. For extra safety, retaining bars are provided on three sides of the table. The table can be hydraulically elevated from 28 inches in the lowered position to 44 inches in the elevated position. Adapting the standard model as far as possible, the manufacturer furnished the unit with a 30 inch x 30 inch main top, single speed foot pump, floor lock type brake, two 5 inch diameter swivel casters and two 5 inch diameter rigid casters.

Camachines

wherever rubber or plastics are processed in ROLL form



CAMACHINE engineers have perfected specialized slitters and roll-winders to meet requirements wherever rubber or plastics are made, shipped, processed or used in roll form.

A typical example is Camachine 6-2C, widely used by makers of tires, belting, hose, proofed goods and sheet plastics. Camachine 6-2C handles webs up to 62" wide, producing uniformly rewound rolls up to 24" diameter, and slitting strip as narrow as ½". Like all Camachines, 6-2C is simple in construction, easy and economical to operate.

Camachine specialists will gladly provide counsel regarding the right type of slitting and roll-winding equipment to meet your needs. Write for literature.

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Camachines
FOR FAST, TOP QUALITY ROLL PRODUCTION
. . . the world over

AA-198

Set this Gage

...then forget your thickness troubles

That's all there is to it. Once it's set, the "Magnetic" Schuster Gage keeps a constant, continuous check and control of material-thickness right on the roll during processing. Any variation beyond set limits is detected by the Gage and results in any instant action you desire: a warning signal, or automatic corrective adjustment of the mill, or automatic stopping of equipment.

Every P&W setup — consisting of "Magnetic" Schuster Gage, "Magnetic" Control Meter, power unit — is planned to eliminate time-and-material-wasting thickness variables. Pratt & Whitney is prepared to recommend the best setup for your equipment and requirements. New descriptive literature is yours for the asking.

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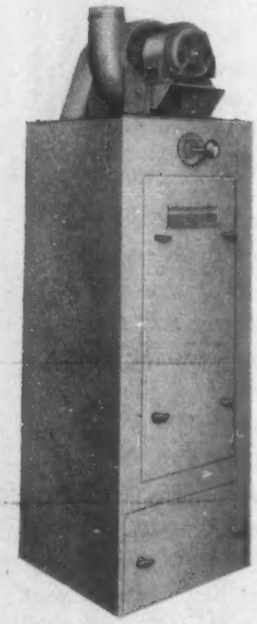
"Magnetic" Schuster Gage

...for the Rubber Industry

WITH ONE CONTROL UNIT

or the new "Package Type" Unit

Greater employee efficiency, lower maintenance costs and increased production can be yours with a properly engineered central dust collecting system. Nationally-known plants such as that of the large rubber processing concern shown above, select Parsons consistantly for all their dust problems. Each of these Oval Bag dust arrestors handle 40,000 cubic feet of air per minute continuously, without shut-down.



Parsons' dust collecting systems are the accepted standard for collecting carbon black, talc and all types of rubber dust.

Introducing the new

Dust Control Unit

For collecting dust from individual machines, or from a small group of points where dust is localized in a more concentrated area, the Parsons "GEM" Dust Collector (left) is recommended. This small, compact unit, designed for quick installation, has ample filter cloth to maintain uniform suction. It has proved it's effectiveness in many kinds of rubber plant operations and in scores of other industries.

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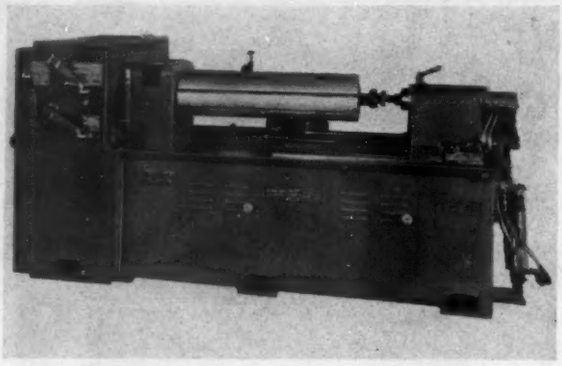
CREATIVE ENGINEERS MANUFACTURERS

Parsons ENGINEERING CORP.

2545 EAST 79th STREET, CLEVELAND, OHIO

Black Rock Washer Cutter

A new machine that will cut large size washers automatically has been developed and introduced by the Black Rock Manufacturing Co., 189 Osborne St., Bridgeport, Conn. Called the Black Rock 4A-20 Washer Cutter, it will handle stock ranging in size



from 10 to 20 inches O.D. having a wall thickness of 1¾ inches and will cut widths from 1/32-inch to 1-inch in width. Four sizes of specially designed expanding mandrels handle the full range of diameters. When in use the mandrel remains in the machine at all times. The expanding and collapsing of the mandrel is accomplished by motor drive through the gear box. All control levers are easily accessible to the operator. Loading and unloading is facilitated by the disappearing type tailstock which swings over the back of the bed, and is air actuated.

F. J. Stokes Machine Co., Philadelphia, Penna., has introduced a fully automatic, 15-ton capacity, **rotary type press for high speed cold molding.** The design is said to prevent jamming and undue strain on the machine and punches in the event of an overload. It will take pieces up to a maximum diameter of 1-7/16 inches and maximum die fill of 2-1/16 inches. Where holes or perforations are required in the part, a core rod attachment can be furnished.

PHILBLACK O PHILBLACK A PHILBLACK O PHILBLACK A PHILBLACK O

Philadelphy ?

SEE PAGE 652

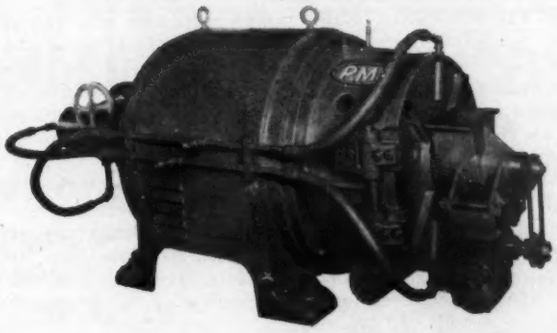
PHILBLACK O PHILBLACK A PHILBLACK O PHILBLACK A PHILBLACK O

P. M.
GRINDING AND CUTTING EQUIPMENT

•

HEAVY DUTY CUTTER

- This machine is specially designed for reducing to small size pieces all kinds of soft and hard rubber scrap.
- Water cooled sides allow continuous operation of the machine, without overheating.
- Provided with safety type drive pulley.
- The capacity of the P.M. CUTTING MACHINE is from 600 to 1000 lbs. per hour on soft rubber and 1000 to 1500 lbs. on hard rubber scrap.
- Power required 10 H.P. 4 V-belt drive.



HEAVY DUTY RUBBER GRINDER

- Available in Direct or Belt Drive.
- 50 H.P. motor.
- Operation entirely automatic.
- Water cooled to permit continuous operation without overheating.
- Fineness of ground rubber easily adjusted by simple turn of wheel.
- Capacity 400 to 800 lbs. per hour.

Developed to meet the need for a more rugged Scrap Rubber Grinder with increased capacity

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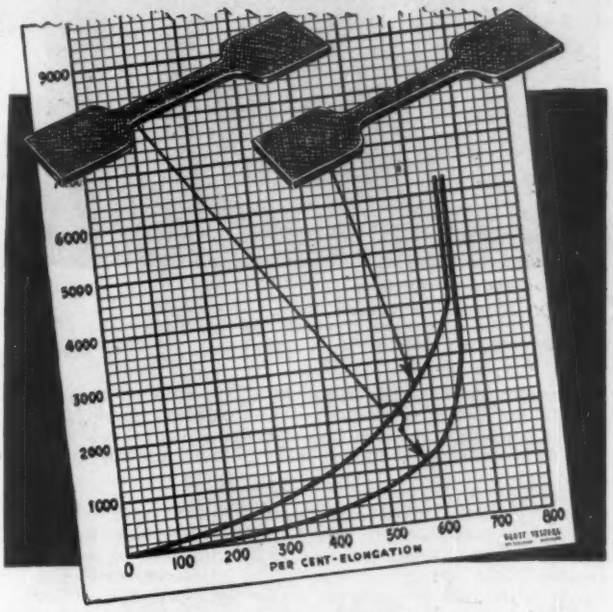
TESTED IS TRUSTED

Same Tensile, but vastly different "Tightness" of Cure

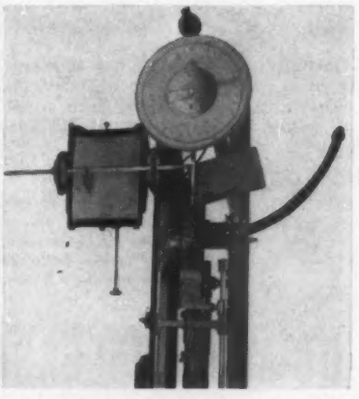


The above picturized graph shows two specimens of identical tensile strength but widely differing moduli. This is an excellent example of how *Scott Testers enable you to define the characteristics of stock IN ACTION, so that compounding and rate of cure may be best adjusted for the end use intended. Scott Rubber Testers have for over 30 years been world's standard for tensile and elongation testing.

* Registered Trademark

Model ORR—L-5

*with additions developed by us in cooperation with the Subcommittee on Test Methods of the **Office of Rubber Reserve and the **National Bureau of Standards.*



With four major new features enhancing accuracy to a new high degree, this Scott Tester is made in capacities of 150 lbs. or 68.04 kgs. tensile. Conversion kits are available for existing Model L Scott Testers.

** Use of these names does not constitute an endorsement.

SCOTT TESTERS, INC. 85 Blackstone St. Providence, R. I.

Standard of the World

MORE EYE APPEAL FOR LAWN MOWER TIRES

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DC Mold Release Emulsion No. 35 reduces mold maintenance and permits easy removal of well defined and highly polished lawn mower tires.

Your customers at the retail level are sold to a large extent on the appearance of the rubber goods you mold. And that applies to everything that goes into the retail market from tractor to lawn mower tires, from rubber heels to medicine droppers.

But if you use ordinary mold lubricants and try to meet the consumer demand for high surface finish, your inspection costs go up and the number of rejects increases, or your operators play fireman with the spray gun and boost your mold maintenance. That puts you out of competition price-wise in a buyer's market. You can, however, greatly improve quality and actually reduce costs by using DC Mold Release Emulsion No. 35.

Molding semi-pneumatic lawn mower tires from reclaim is one of the difficult jobs done by the Grand Prairie Rubber Company of Grand Prairie, Texas. Tread ribs are easily torn; air checking is common; and mold maintenance costs are abnormally high. To meet competition production, engineers at Grand Prairie sprayed the molds with a dilute solution of DC Mold Release Emulsion No. 35. They found that it improves the flow of stock and eliminates air checking. Easy release cuts the number of rejects; "bleeders" stay open and the molds stay clean many times as long.

In molding most rubber stocks, Emulsion No. 35 improves appearance and cuts costs. Simply spray or wipe molds with a solution containing 50 to 150 parts of water to 1 part DC Mold Release Emulsion No. 35.

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DC MOLD RELEASE EMULSION NO. 35

FOR MORE INFORMATION PHONE OUR NEAREST BRANCH OFFICE OR WRITE FOR CATALOG NO. 612-V7

Dow Corning
FIRST IN SILICONES

REVIEWS

BOOKS

Kunstkautschuk (Artificial Rubber). Second Edition. By Arthur Springer. Published by Carl Hanser Verlag, Munich Germany. 6 x 9 in. 156 pp.

This small, well printed book, with many fine illustrations, was published originally in 1941. The current volume was written in 1946 and published in 1947. It is appropriately titled "Kunstkautschuk" (Artificial Rubber) rather than "Synthetic Rubber," since no one has yet succeeded in synthesizing natural rubber.

The book contains seven chapters. In the first three chapters the author describes the history of natural and "synthetic" rubber, the technology, and the testing procedures for crude and vulcanized materials. The next three chapters present the scientific and technical fundamentals of rubber synthesis, a list and description of the technically produced rubbers, including some non-vulcanizable thermoplastic polymers, and the application of these rubbers. In the final chapter, the economical problem of rubber synthesis is discussed.

Although the book does not offer much that will be new to the American technologist, it will tell him a good deal about how the German rubber industry manufactured and used "Kunstkautschuk", without regard to the economics involved. It should also prove of interest in that comparisons can be made between American and German methods of manufacturing and testing rubber products. The 61 excellent illustrations will help in making such comparisons.

It was interesting to this reviewer to note how the author tries to differentiate between natural and synthetic rubbers and to indicate how both products have a definite future. In the reviewer's opinion, this will change, even though the change might be in the distant future, if natural rubber can be synthesized in all of its properties, chemically, physically and biologically.

Since the author has attempted to acquaint the layman with the fundamentals of "synthetic rubber" he has employed a good deal of non-technical language and accordingly the book can be recommended to those who wish to acquire a quick, yet fairly complete, knowledge of the subject. In this connection, the beginning of the fourth chapter may be noted.

A new edition of this book might contain some recognition of the fact that the American rubber, chemical and petroleum companies quickly succeeded in overcoming the lack of natural rubber shortly after the beginning of World War II, both qualitatively and quantitatively. As far as milling is concerned, the American product was better than the German buna right from the start.

Despite some of its apparent limitations, this book will remain a valuable contribution to the history of both natural and synthetic rubbers.

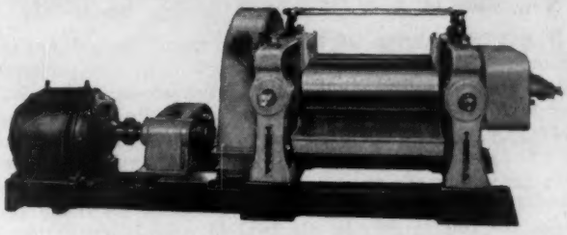
RICHARD WEIL

•

Symposium on Usefulness and Limitations of Samples. Published by American Society for Testing Materials, 1916 Race St., Philadelphia 3, Penna. 6 x 9 in. 40 pp. $1.00.

This booklet contains the three papers (and discussion) presented at the symposium sponsored by A.S.T.M. Committee E-11 on Quality Control of Materials at the 1948 Annual Meeting of the Society. The three papers, and authors, are: "Sampling and Its Uncertainties," by S. S. Wilks (Princeton University); "On Variations in Materials, Testing, and Sample Sizes," by L. E. Simon (Aberdeen Proving Ground); and "The Amount of Inspection as a Function of Control of Quality," by G. R. Gause (Bell Telephone Labs.). Several interesting questions are raised in the papers, with probable solutions offered.

NEW Design Heavy Duty MILLS



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New features include reduced floor space; increased horsepower ratings where necessary; built-in herringbone gear speed reducers, mounted on anti-friction bearings; and our new design, internal expanding, shoe-type, hydraulically loaded safety brake—unquestionably the finest safety device available for mills at the present time. Send for specifications.

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FEATURES

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Bench Space 5" x 6" — Bench Overhang 9"
Height 14" — Hardened Cam and Anvil
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Chromalox Heaters — Fenwal Thermostats
Mold Sizes — 1½" x 2" x 4" and 2" x 3" x 6"
Pressure Adjustments on Anvil
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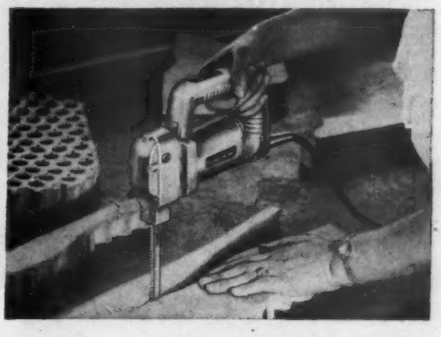
New STANLEY No. 99 SPONGE OR FOAM RUBBER CUTTER

. . . cuts up to 4" thick at speeds up to 30 ft. a minute!



A brand new electric tool designed by Stanley that puts cutting of sponge and foam type rubber on a production basis. Saves time and material.

Follows any line or templet, inside or outside—straight cuts, curves and angles — with hairline precision. No concave edges, no torn or ragged work.

Light weight (only 4 lbs.). The duplex handle permits easy handling on all operations. Girl operators like it.

No. 99 Sponge Rubber Cutter operates on either A.C. or D.C. Blades are made of alloy steel for long life and are easily replaceable.

Save material, save time with the new Stanley Sponge Rubber Cutter No. 99. Ask your supply house, or write for folder. Stanley Electric Tools, 562 Myrtle St., New Britain, Conn.

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WILL KEEP YOUR MOLDS

as clean as ---a whistle

Clean Molds are an essential factor in rubber molding

Manufacturers have found that Rubber-Flo Mold Lubricant will keep molds cleaner for a longer period . . . increasing production and reducing maintenance costs.

RUBBER-FLO is safe! It is a non-toxic odorless mold lubricant.

RUBBER-FLO is quick! It may be sprayed, brushed or dipped onto the mold or onto the stock before molding. It will not clog a spray gun.

RUBBER-FLO is economical! The savings in maintenance more than pay for it.

RUBBER-FLO is low in cost! It comes in concentrated form and is diluted with water for use.

PREVENTIVE MAINTENANCE CO.

1997 Fairfield Ave. Bridgeport, Conn.

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Bibliography of Rubber Literature: 1942-43. Published by the Division of Rubber Chemistry, American Chemical Society. Available from Rubber Age, 250 West 57th St., New York 19, N. Y. 6 x 9 in. 356 pp. $5.00.

The latest edition of this bibliography, issued under the sponsorship of the Rubber Division, A.C.S., and prepared by a board of six editors, covers the literature of rubber, including patents, issued throughout the world during the years of 1942 and 1943. It contains approximately 3,850 references as compared with about 3,350 references in the previous edition (covering the years of 1940 and 1941). The increased number of references is not solely based on more prolific literature and patents in the 1942-43 period, but rather on a more careful search through the literature for the period covered, particularly the patent literature. Lke the previous edition, the current one includes brief, one paragraph abstracts in practically all cases where the title of the article or the patent is itself not sufficiently explanaory. Copies of the 1942-43 Rubber Bibliography have been distributed without cost to all regular and associate members of the Rubber Division. Copies to non-members and extra copies to members are available at $5.00 each.

•

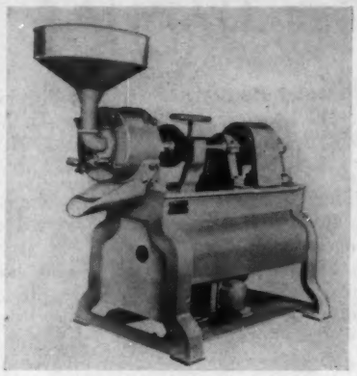
Summarized History of the Operations of Rubber Development Corporation. By Douglas H. Allen and Francis Adams Truslow. Douglas H. Allen, 222 Eleventh Avenue, New York 1, N. Y. 5½ x 8½ in. 20 pp. $1.00.

This pamphlet presents an unofficial summarized history of the Rubber Development Corporation and its predecessor, the Rubber Reserve Company, in the procurement and development of natural rubber during the period of the Inter-American Agreements, April 1, 1942, to June 30, 1947. It serves to clarify the many misconceptions as to the aim and the scope of the Corporation, and details the actual work and accomplishments of the organization during the wartime period. Particular attention is paid to the matter of prices and to the ultimate cost per pound of the wild rubber procured by the Government during the period covered.

•

Capital Formation Under Free Enterprise. National Association of Manufacturers, 14 West 49th St., New York 20, N. Y. 6 x 8½ in. 88 pp.

In this study the NAM Research Department has set forth the underlying concepts of capital formation and statistical estimates in this field. It draws heavily on basic work in this area by the National Bureau of Economic Research and the U. S. Department of Commerce. The needs of capital formation are outlined, and the objectives of the system discussed.



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Gravity feed or Pump feed

High speed mill for grinding pigments, fillers, compounds and emulsions, paints, coatings.

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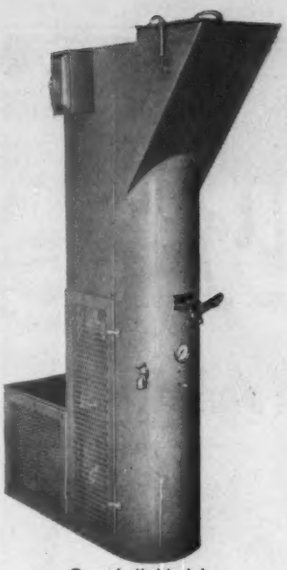

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This Duster makes its own AIR!

No Factory Air Line Connections Are Needed!

If your dusting machine clogs up chances are moisture from factory air lines is responsible.

The Campbell 1404-2 Duster has a pump *within* the chamber which *makes* its *own* air. No connections are needed. Chamber is moisture-proof, dust-proof, air-tight. Ejects four ounces to 30 pounds of dust per hour in a mist or cloud.

Write for quotation and get trouble-free operation. Save time and money. Immediate delivery.

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2—Campbell Rubber Floor Tile Cutting and Blocking Machine.

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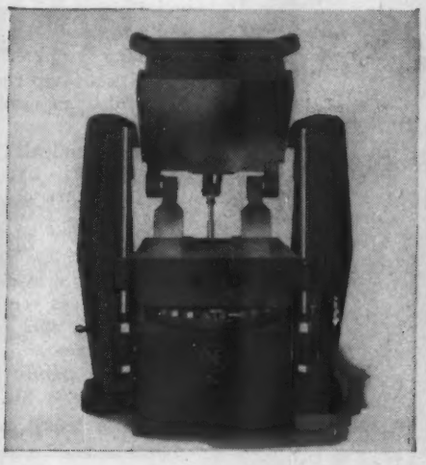

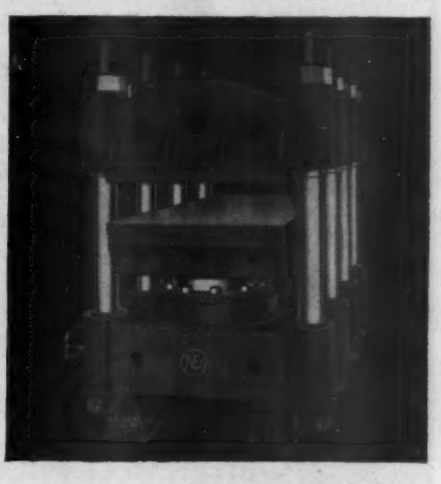

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Vulcanized
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Types, grades and blends for every purpose, wherever Vulcanized Vegetable Oils can be used in production of Rubber Goods—be they Synthetic, Natural, or Reclaimed.
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Handbook of Plastics (Second Edition). By H. R. Simonds, A. J. Weith, and M. H. Bigelow. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 3, N. Y. 6½ x 9¼ in. 1512 pp. $25.00.

Whereas the first volume of this work was comprehensive (see RUBBER AGE, page 466, August, 1943), this revised edition is somewhat on the colossal side. In effect, the second edition of this valuable handbook is an entirely new book, since during the last few years most of the valuable discoveries and developments of the previous war years have been translated into commercial production. Each one of these developments is given the same exhaustive treatment which marked the first edition.

As the authors indicate in the preface, the full text of the first edition has been reexamined and largely rewritten. Not only have the new materials and the new processes been described, but tables and data covering established materials have been revised to reflect changes. The chapters on Chemistry and Analysis have been enlarged and treated from a new angle of approach, and new sections have been added on laminating, stress and strain, patents and accounting, as well as nearly a hundred new tables and formulae. Post-forming and low-pressure molding are fully covered in the new work.

The general arrangement of the first edition has been kept in the new book, but some rearrangement of chapters has been made and the various part divisions of the first edition (nine in all) have been omitted. Special care has been taken to provide a complete, usable index, which alone covers forty-seven pages. The list of trade names and trade marks has been brought completely up-to-date and both the general and chemical glossaries have been considerably expanded. The bibliography has also been expanded to cover the available books reports and magazines.

Like the first edition, the current work covers plastics of all kinds and forms from raw materials to finished products, including details of the manufacturing methods, machinery and processes. It is a valuable tool for every individual and company engaged in or concerned with the plastics art. Would that an equally exhaustive treatise were available in the rubber manufacturing field!

•

Akron Chemical Colors in Vinyl Plastics. (Technical Bulletin No. 7). Akron Chemical Co., 255 Fountain St., Akron 4, Ohio. 8½ x 11 in. 4 pp.

Test recipes as well as mixing and molding procedures are outlined for the company's chemical colors in vinyl plastics in this technical bulletin. Standard test data as to dispersion, light fastness, cracking or bloom, heat stability and color transfer for the colors under discussion, is presented. General comments and specific recommendations for use are offered. A handy chart outlines test data on these chemical colors in Geon 101.

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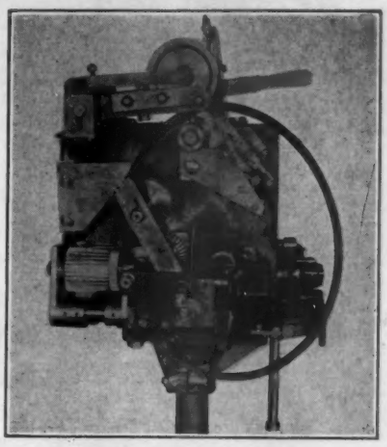

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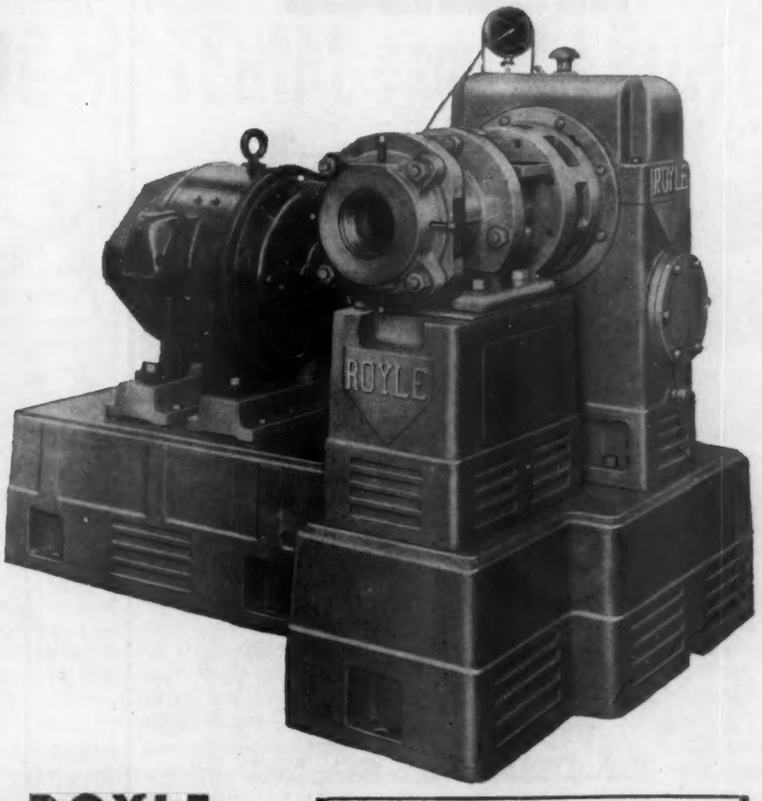

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Natural Rubber

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Plastic Scrap

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REVIEWS (CONT'D)

Storage, Handling and Feeding of Activated Carbon. Industrial Chemical Sales Division, West Virginia Pulp and Paper Co., 230 Park Avenue, New York 17, N. Y. 6 x 9 in. 12 pp.

This booklet discusses in some detail the shipment of carbon, the storage of carbon, handling activated carbon, bag emptying equipment, fundamental consideration in feeding, supplement to dry feed equipment, and solution feed equipment. The information contained in its pages was originally intended for the water purification field and first appeared in the book "Taste and Odor Control in Water Purification", published by the Industrial Sales Chemical Division. However, the problems on the handling of activated carbon are the same throughout industry, and the booklet is now available to all users of activated carbon.

•

Bristol Thermocouples and Pyrometer Accessories. (Bulletin P1238). Bristol Co., Waterbury 91, Conn. 8 x 10½ in. 56 pp.

This bulletin contains detailed information on thermocouples, protection tubes, and other pyrometer accessories. A technical section, described as the "Users' Manual", contains engineering handbook data on such subjects as factors affecting thermocouple life, corrosion and poisoning, thermocouple reproducibility, thermocouple insulation, etc. A catalog section, described as the "Buyers' Guide", is indexed and liberally illustrated with line drawings and photographs. The company's complete line is listed in an easy-to-use manner. Tables of calibration data for the commonly-used base-metal and rare-metal thermocouples is included.

•

Testing Machines for Plastics. (Bulletin No. 36). Tinius Olsen Testing Machine Co., Easton Rd., Willow Grove, Penna. 8½ x 11 in. 36 pp.

All the physical testing equipment made by the company especially for the testing of plastics are described in this bulletin. Detailed sections on the Plastiversal, the Lo-Cap Universal, electronic recorders, flow, torsion, load deformation, stiffness, torsion-stiffness, impact, heat distortion, creep and brittleness testers are included. The Wearometer, the Dilatometer and Folding Endurance testers are also discussed. Complete specifications and explanatory charts and photographs are included.

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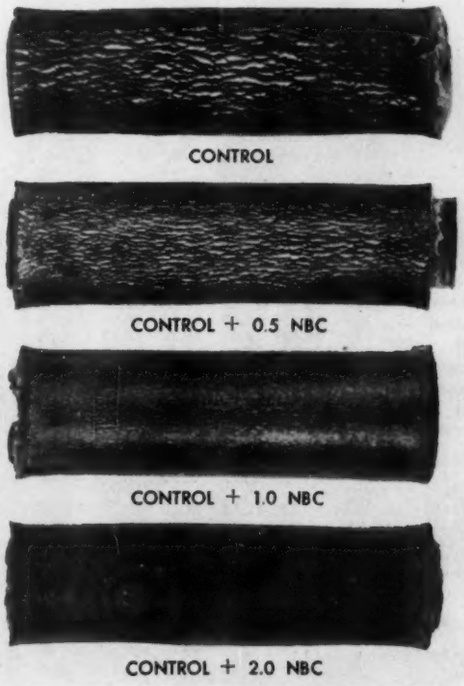

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✓ Improves heat resistance of neoprene

✓ Retards sunlight discoloration of neoprene

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, MARCH 9, 1949

Natural Rubber

The price of spot rubber on the Commodity Exchange has swung in a range of 1.12 cents since our last report (February 9), high for the period being 19.12 cents reached on March 8 and again on March 9, and low being 18.00 cents reached on February 15. The average price of spot rubber for the month of February was 18.49 cents based on 19 trading days. This compares with an average price of 19.23 cents for the month of January.

Although the Rubber Study Group meetings are almost three weeks off, the world rubber trade is generally inclined to await the outcome of these meetings. This attitude prevails in spite of the general realization that the Group will do no more than suggest ways and means to aid the producer and that actually, little or nothing will be adopted by producing countries. There may be some support program instituted for rubber producers, but such is not likely in view of the vast sums of money which the respective Governments will have to tie up over a period of time.

Russia is credited with ordering out an additional 10,000 tons of rubber from Malaya this month which is said to make a total of 45,000 tons for the first quarter of this year. This is materially in excess of the Russian takings for the same period a year ago and some 60% higher rate of takings than the average for 1948.

Word from Indonesia is heartening regarding the internal political situation. Press advices from Batavia credit the Dutch with announcing that they would transfer sovereignty to all Indonesia by July 1. This announcement has had the effect of creating a more widespread impression that a real increase in natural rubber production will surely be witnessed in the second half of the year.

Today's quotations in the outside market, London and Singapore, follow:

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.19
March	.19
April	.19
Thin Latex Crepe:	
Spot	.25½
March	.25½
Thin Brown Crepe, No. 2	.15½
Ambers, No. 3	.15½
Flat Bark Crepe	.12⅜

London Market

(Standard Smoked Sheets)

May	18.95 - 19.16
July-September	18.48 - 18.69

Singapore Market

(Standard Smoked Sheets)

March	17.31 - 17.47

Synthetic Rubber

(Dry Types-Per Pound)

Butaprene NF	.390 - .415
Butaprene NL	.400 - .425
Butaprene NAA	.440 - .465
Butaprene NXM	.470 - .495
Chemigum 30 N4NS	.400 - .470
Chemigum 50 N4NS	.400 - .470
Chemigum N3	.450 - .520
Hycar OR-25	.400 - .425
Hycar OR-15	.470 - .495
Hycar OS-10	.400 - .425
Neoprene Type E	—— - .650
Neoprene Types CG and AC	—— - .500
Neoprene Types FR and KNR	—— - .750
Neoprene Type S	—— - .370
Paracril 18	.430 - .450
Paracril 26	.440 - .460
Paracril 35	.510 - .530
Silastic (compounded)	.235 - .440
Thiokol Type A	.370 - .470
Thiokol Type ST	.750 - .850
Thiokol Type FA	.520 - .620
Thiokol PR-1	.750 - .850

Scrap Rubber

The scrap rubber market took a slight upward turn during recent weeks but the increases were not of an appreciable nature. Export conditions, long a sore spot in the general scrap picture, have shown some slight improvement. As is the case with the domestic market, export gains have not been substantial. The price structure remains substantially the same. Current quotations follow:

(Prices to Consumers, Delivered Akron)

Mixed passenger tires	ton	$13.00
Beadless truck tires	ton	nom.
Mixed truck tires	ton	13.00
Beadless passenger tires	ton	nom.
No. 1 passenger peelings	ton	42.50
No. 1 truck peelings	ton	42.50
Red passenger tubes	lb.	.06¼
Black passenger tubes	lb.	.03½
Mixed passenger tubes	lb.	.03¾
No. 2 truck tubes	lb.	nom.
Red truck tubes	lb.	.06
Black truck tubes	lb.	.03
Buffings	ton	15.00

Reclaimed Rubber

Preliminary estimate for the consumption of reclaim during 1948 was set at 272,194 tons. Estimates for the consumption of reclaim during December, 1948, amounted to 20,122 tons, compared with the 22,170 tons consumed during November. The demand for reclaim, which had been continuing at a fairly brisk pace, now seems to be leveling off to a slight degree. Reclaim prices have not changed substantially during this period. Current quotations follow:

Tires

Black, Acid	lb.	.09 - .09½
Black, Digester	lb.	.08½ - .09
Peels	lb.	.09 - .09½
GR-S Whole Tire	lb.	.08½ - .09

Inner Tubes

Black	lb.	.12¾ - .13¼
Red	lb.	.13 - .14
GR-S	lb.	.10¼ - .10¾
Butyl	lb.	.08½ - .09

Shoe

Unwashed	lb.	.08¼ - .08¾

Cotton Tire Fabrics

The market for cotton tire fabrics maintains the low level evidenced during the past few months. As has been the case in other fields, export demand has been slowed considerably due to foreign monetary exchange difficulties. Purchase of chafers by the rubber industry continued at a minimum level. Prices in existence for the past few months are expected to hold in the foreseeable future. Current quotations follow:

Standard, Peeler, 12/4/2	lb.	.74
Standard, Peeler, 14/4/2	lb.	.76
Standard, Peeler, 16/4/3	lb.	.7850
Extra Staple, Peeler, 12/4/2	lb.	.8315
Extra Staple, Peeler, 14/4/2	lb.	.8575
Extra Staple, Peeler, 16/4/3	lb.	.8825

Chafers

14.4 oz. (per sq. yard)	lb.	.7400
9.25 oz. (per sq. yard)	lb.	.6975
11.65 oz. (per sq. yard)	lb.	.6700
8.9 oz. (per sq. yard)	lb.	.7125

Cotton

The price of middling uplands on the Cotton Exchange has swung in a range of .69 cents since our last report (February 9), high for the period being 33.83 cents reached on February 23, and low 33.14 cents on February 9. The average price of middling uplands for the month of February was 33.41 cents based on 23 trading days. This compares with an average of 33.37 cents for the month of January.

The Department of Agriculture finally called for a 20% cutback in cotton production this year to avoid surpluses. Officials said privately that they did not think the requests would be heeded. Because of the Government's price supports on the 1949 crop, they said, it looked like the farmers would try to produce more cotton, instead of less. The department said a crop of 12,000,000 bales would be "ample" to meet all needs in view of stocks left over from last year's crop of 15,000,000 bales. Nearly one-third of this crop is expected to be on hand when the new crop rolls in next fall.

Negotiations by India to purchase approximately $30,000,000 of American cotton are still under way, although the problem of financing the purchase still remains unsettled. Indian representatives report India in dire need of American cotton, and hope that a financing plan can be arranged.

The Egyptian crop is estimated at 1,234,000 bales of 720 lbs., compared with 873,000 last year. Despite the fact that the crop is 40% larger than last year, the bulk of it is being held in the interior, as receipts are 100,000 less than last year.

Quotations for middling uplands on the Exchange follow:

	Feb. 8	March 9		
	Close	High	Low	Close
March	31.57	32.49	32.34	32.39
May	31.26	32.26	32.14	32.22
December	28.56	27.98	27.92	27.97

Closing Rubber Prices on New York Commodity Exchange

(No. 1 R.S.S. Contract)

FROM FEBRUARY 9 TO MARCH 9

Date Feb.	Spot	Mar.	May	July	Sept.	Sales
9	18.38	18.25	18.00	17.75	17.80	92
10	18.38	18.25	18.05	17.95	17.85	21
11	18.25	18.20	17.98	17.83	17.73	79
12	....	....	....	....	....	...
13	....	....	....	....	....	...
14	18.25	18.15	17.98	17.75	17.70	60
15	18.00	18.07	17.80	17.62	17.52	165
16	18.25	18.30	18.15	18.00	17.80	81
17	18.62	18.65	18.30	18.10	18.00	87
18	18.38	18.40	18.25	17.96	17.90	21
19	....	....	....	....	....	...
20	....	....	....	....	....	...
21	18.62	18.60	18.50	18.25	18.05	82
22	....	....	....	....	....	...
23	18.62	18.55	18.47	18.15	18.00	84
24	18.62	18.62	18.43	18.10	18.00	62
25	18.38	18.46	18.27	18.00	17.85	45
26	....	....	....	....	....	...
27	....	....	....	....	....	...
28	18.38	18.53	18.30	18.10	17.98	62
Mar.						
1	18.75	18.65	18.53	18.30	18.10	84
2	18.62	18.55	18.40	18.20	18.00	85
3	18.75	18.72	18.55	18.38	18.25	65
4	19.00	18.90	18.75	18.52	18.40	88
5	....	....	....	....	....	...
6	....	....	....	....	....	...
7	19.00	18.90	18.72	18.55	18.35	22
8	19.12	18.90	18.91	18.65	18.51	40
9	19.12	18.90	18.90	18.65	18.49	74

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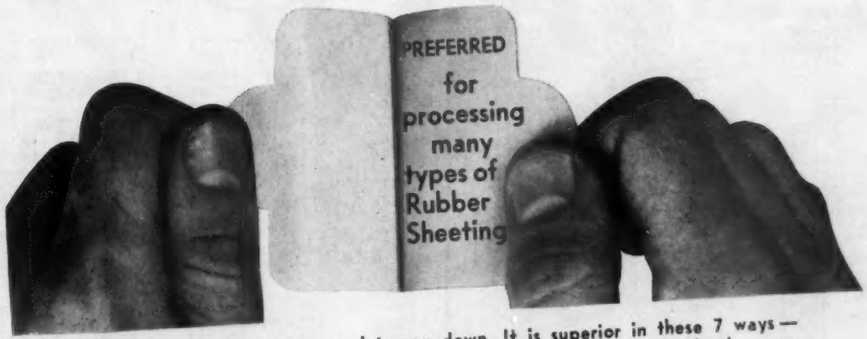

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Three standard qualities. 20 and 40 inches wide, in 100 and 250 yard rolls. Special size rolls to order.

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STATISTICS *Of Interest to the Rubber Industry*

U. S. Imports and Re-Exports of Natural Rubber

	GROSS IMPORTS												
	Natural Rubber (Dry)			Natural Rubber (Latex)			Guayule				RE-EXPORTS		TOTAL NET IMPORTS
Year	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Total Gross Imports Long Tons	Long Tons	Total Declared Value	Long Tons
1936	467,064	152,072,496	14.54	19,852	6,659,899	14.98	1,229	286,552	10.41	488,145	12,581	4,488,223	475,564
1937	574,600	237,307,041	18.44	23,185	10,213,670	19.67	2,694	745,873	12.36	600,479	7,902	3,385,433	592,577
1938	397,620	125,357,730	14.07	11,878	4,147,318	15.59	2,485	623,819	11.21	411,983	5,652	1,799,124	406,331
1939	469,803	167,558,245	15.92	27,438	10,467,552	17.03	2,232	463,345	9.27	499,473	13,125	5,832,618	486,348
1940	780,820	303,117,726	17.33	33,789	14,593,466	19.28	3,634	758,007	9.31	818,243	7,060	3,197,136	811,183
1941	989,329	401,890,393	18.14	34,798	15,965,627	20.48	4,881	1,145,767	10.48	1,029,008	5,376	2,757,872	1,023,632
1942	265,980	112,377,896	18.86	10,646	5,630,667	23.61	5,523	1,660,792	13.42	282,149	10,856	5,913,386	271,293
1943	50,348	31,364,033	27.81	1,890	1,312,202	30.99	7,679	3,636,789	21.14	59,917	22,587	16,446,707	37,330
1944	103,820	73,908,389	31.78	3,091	2,092,211	30.22	6,700	3,351,233	22.33	113,611	9,739	8,712,695	103,872
1945	134,454	95,850,441	31.82	4,773	3,115,853	29.14	10,040	5,963,797	26.52	149,267	9,509	7,201,746	139,758
1946	366,415	222,552,939	27.12	8,421	5,843,085	30.98	5,344	2,859,246	23.89	380,180	7,711	5,331,954	372,469
1947	690,954	306,919,456	19.83	17,722	9,820,080	24.91	2,880	1,492,825	20.30	711,556	4,122	2,354,494	707,434
1947:													
Feb.	57,771	30,580,942	23.63	2,426	1,550,499	28.52	481	256,760	23.84	60,678	1,991	1,149,953	58,687
Mar.	35,128	19,421,550	24.46	496	324,103	29.15	463	246,573	23.76	36,087	39	23,592	36,048
Apr.	45,453	23,627,600	23.21	34	26,754	34.84	524	282,941	24.09	46,011	26	20,725	45,985
May	91,918	47,208,658	22.93	763	442,050	25.87	345	186,201	24.11	93,026	14	9,169	93,012
June	62,346	28,339,739	20.29	2,825	1,642,417	25.95	554	298,705	24.07	65,725	47	22,998	65,678
July	56,080	22,379,698	17.08	1,407	855,454	25.09	74	27,458	16.55	57,561	421	226,777	57,140
Aug.	43,637	16,127,766	16.93	1,784	960,877	24.48	104	24,768	18.54	45,525	191	118,666	45,334
Sept.	45,724	14,589,611	14.24	516	324,206	27.12	44	10,414	15.29	46,284	174	95,640	46,110
Oct.	46,898	14,819,306	13.11	3,081	1,370,242	19.85	....	.....	....	49,979	134	.64,620	49,665
Nov.	48,952	16,962,935	15.46	1,994	1,042,644	23.13	....	.....	....	50,946	514	289,752	50,432
Dec.	69,158	24,458,323	15.21	2,438	1,280,834	23.45	....	.....	....	71,596	371	215,958	71,225
1948:													
Jan.	76,723	29,782,199	17.33	4,130	2,044,850	22.11	....	.....	....	117,906	334	206,103	117,572
Feb.	51,528	21,027,604	18.06	2,400	1,420,676	26.43	43	10,235	10.53	53,971	290	170,339	53,681
Mar.	68,848	27,902,550	18.09	3,148	1,730,014	24.02	25	6,845	10.05	72,021	467	215,156	71,554
Apr.	38,433	15,136,536	17.35	2,284	1,260,932	24.65	30	7,076	10.53	40,747	343	190,815	40,404
May	37,227	14,409,747	17.28	3,442	1,915,744	24.84	40	9,435	10.53	40,709	1,031	485,941	39,678
June	62,376	25,338,739	18.13	2,288	1,335,173	26.05	60	14,152	10.53	64,724	718	348,043	64,006
July	60,070	25,206,980	18.07	3,654	2,002,902	24.48	100	23,587	10.53	63,734	466	243,774	63,268
Aug.	65,736	26,975,557	18.33	2,395	1,389,495	25.81	....	.....	....	67,771	520	268,912	67,251
Sept.	49,119	21,480,244	19.52	1,434	813,347	25.24	....	.....	....	50,553	514	229,016	50,039
Oct.	58,300	26,161,356	20.03	2,728	1,574,419	25.83	....	.....	....	61,028	675	320,570	60,353
Nov.	49,800	22,292,055	19.98	813	466,095	25.59	....	.....	....	50,613	772	349,315	49,841

Source: U. S. Department of Commerce.
Notes: (1) Figures for latex are on a dry weight basis. (2) Figures for re-exports include natural rubber (dry and latex) and guayule.

Natural Rubber (Including Latex and Guayule)

(All Quantities in Long Tons)

Year	New Supply	Consumption	Re-Exports	Stocks On Hand at End of Period
1936	488,145	575,000	12,581	223,000
1937	600,479	543,600	7,902	262,204
1938	411,983	437,031	5,652	231,500
1939	499,473	592,000	13,125	125,800
1940	818,243	648,500	7,060	288,864
1941	1,029,007	775,000	5,376	533,344
1942	282,653	376,791	10,856	422,714
1943	55,329	317,634	20,815	139,594
1944	107,834	144,113	9,665	93,650
1945	135,672	105,429	6,743	118,715
1946	400,687	277,597	4,338	237,467
1947	688,354	562,661	4,101	129,038
1948	735,227	627,332	6,673	141,541
1947:				
Jan.	102,080	45,328	43	294,191
Feb.	30,318	40,983	1,253	283,479
Mar.	40,437	43,104	509	280,812
Apr.	55,976	43,818	0	292,970
May	32,738	43,018	0	330,960
June	57,055	42,329	311	345,175
July	57,243	40,389	421	131,624
Aug.	44,672	47,289	191	130,040
Sept.	46,241	50,557	174	122,097
Oct.	49,340	57,286	314	114,115
Nov.	50,840	52,076	514	110,752
Dec.	71,414	56,284	371	129,038
1948:				
Jan.	80,564	58,174	334	136,227
Feb.	54,418	51,012	290	148,081
Mar.	72,070	54,444	467	130,295
Apr.	40,947	50,616	343	123,248
May	40,709	52,022	1,031	112,724
June	64,725	55,701	718	119,818
July	63,775	48,769	466	128,446
Aug.	68,131	53,366	520	129,622
Sept.	50,536	52,131	514	123,912
Oct.	61,027	49,617	675	118,187
Nov.	50,671	51,632	746	113,251
Dec.	87,634	45,985	569	141,541

Source: 1936-40, U. S. Department of Commerce; 1941 to date, Rubber Division, OMD, and Predecessor Agencies.

U.S. Gross Imports of Balata, Jelutong, Gutta-Percha, etc.

(All Quantities in Long Tons)

	Balata		Jelutong		Gutta-Percha & Other Guttas	
Year	Tons	Value	Tons	Value	Tons	Value
1936	535	199,368	6,163	1,296,364	1,568	555,643
1937	354	151,344	7,109	2,017,786	1,122	440,894
1938	509	181,140	9,132	2,944,504	444	204,582
1939	694	265,553	6,640	1,603,418	1,740	539,255
1940	648	300,500	7,451	2,449,137	2,340	1,004,885
1941	924	489,514	8,821	2,954,001	1,783	607,025
1942	1,544	1,107,059	1,200	530,296	804	525,763
1943	1,047	708,701	35	14,840	....	.....
1944	1,012	660,805	86	45,578	10	4,999
1945	1,361	907,253	....	.....	36	21,970
1946	2,281	2,233,065	304	256,169	423	458,064
1947	1,982	2,276,531	2,878	1,496,887	392	779,591
1947:						
Feb.	270	300,828	36	44,629	17	39,679
Mar.	137	158,530	190	112,132	21	28,898
Apr.	85	106,783	178	86,923	31	48,178
May	212	208,440	524	259,745	86	164,611
June	76	63,612	83	37,314	47	88,420
July	19	24,444	287	122,677	22	50,204
Aug.	151	159,338	143	78,357	19	46,667
Sept.	86	120,633	408	192,352	18	120,633
Oct.	210	389,245	352	187,255	35	88,776
Nov.	290	302,164	148	106,443	15	53,202
Dec.	172	189,934	412	240,023	42	77,371
1948:						
Jan.	56	35,973	481	289,506	69	94,854
Feb.	145	90,023	307	209,015	66	84,839
Mar.	283	189,933	436	271,314	51	101,691
Apr.	82	36,570	651	393,280	52	68,366
May	45	36,109	512	314,432	24	54,191
June	67	36,885	277	211,373	45	41,277
July	120	87,327	205	170,949	15	35,001
Aug.	59	50,511	112	107,431	53	39,607
Sept.	91	67,970	112	83,432	0	0
Oct.	83	67,726	145	181,424	0	0
Nov.	86	49,155	48	36,634	20	10,572

Source: U. S. Department of Commerce.

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Synthetic Rubber—Totals

(GR-S, Neoprene, Butyl, and Buna N Types)

(All Quantities in Long Tons)

Year	Production	Imports	Consumption	Exports	Stocks On Hand at End of Period
1941	8,383	.....	6,259	572	1,702
1942	22,434	.....	17,651	1,419	4,612
1943	231,722	.....	170,891	18,148	41,568
1944	762,630	11,043	566,670	104,266	142,927
1945	820,373	10,407	693,580	83,778	203,454
1946	740,026	7,709	761,699*	72,920	114,963
1947	508,702	1,093	559,566	11,385	62,366
1948	490,434	15,671	450,074	4,674	116,094
1947:					
Dec.	38,134	455	43,230	358	62,366
1948:					
Jan.	39,428	1,121	43,003	416	60,290
Feb.	39,025	1,318	35,375	428	65,649
Mar.	43,940	1,769	38,222	383	72,885
Apr.	40,846	.....	34,632	563	78,722
May	42,866	.....	35,268	367	85,734
June	41,207	.....	39,204	264	89,088
July	41,267	9	34,511	257	96,140
Aug.	39,630	3,599	39,339	276	97,197
Sept.	37,890	2,403	39,215	628	98,246
Oct.	41,419	2,014	38,367	451	102,842
Nov.	40,779	1,988	37,690	366	107,297
Dec.	42,137	1,450	25,248	275	116,094

Source: Rubber Division, OMD, and Predecessor Agencies.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures shown include the output of both government and privately-owned plants. (3) Figures for 1941 are estimated. * Includes year-end adjustment of 5,384 tons to cover non-reporting companies.

Synthetic Rubber—By Type

(All Quantities in Long Tons)

New Supply

	GR-S (Buna S)	GR-M (Neoprene)	GR-I (Butyl)	Buna N Types	Total
1942	3,721	8,956	23	9,734	22,434
1943	182,259	33,603	1,373	14,487	231,722
1944	679,949	56,660	20,252	16,812	773,673
1945	724,859	45,672	52,378	7,871	830,780
1946	613,408	47,766	80,823	5,738	747,735
1947	408,858	31,495	62,824	6,618	509,795
1948	405,954	34,848	56,662	8,641	506,105

Consumption

1942	2,579	6,833	22	8,217	17,651
1943	131,977	26,205	304	12,405	170,891
1944	495,552	46,243	10,763	14,112	566,670
1945	600,145	42,394	43,012	8,029	693,580
1946	632,126	44,357	79,228	5,988	761,699
1947	448,589	37,703	68,838	4,536	559,666
1948	349,308	34,400	59,124	7,241	450,074

Exports

1942	222	1,037	..	160	1,419
1943	14,937	2,540	46	631	18,148
1944	98,380	4,799	530	557	104,266
1945	76,555	5,837	980	406	83,778
1946	68,763	2,642	495	1,020	72,920
1947	7,951	2,617	62	755	11,385
1948	1,141	2,739	20	744	4,674

Stocks at End of Period

1942	1,050	1,786	4	1,772	4,612
1943	30,975	6,415	1,035	3,143	41,568
1944	116,130	11,739	9,892	5,166	142,927
1945	170,571	9,703	18,378	4,802	203,454
1946	81,483	10,470	19,478	3,532	114,963
1947	40,606	5,237	13,184	3,339	62,366
1948	96,875	5,431	11,005	2,783	116,094

Source: Rubber Division, OMD, and Predecessor Agencies.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures for GR-M and Buna N Types include production of privately-owned plants.

Gasoline Consumption

(In Thousands of Barrels of 42 Gallons)

	1941	1942	1943	1944	1945	1946	1947	1948
Jan.	46,190	49,216	36,085	47,540	52,008	51,746	57,057	61,308
Feb.	42,782	42,666	36,274	47,754	48,856	47,654	50,551	56,487
Mar.	49,572	50,820	41,586	52,263	55,364	56,703	59,947	68,171
Apr.	55,879	49,554	48,177	50,005	59,024	62,111	64,140	72,183
May	60,121	53,212	49,828	54,230	60,748	66,800	70,865	77,186
June	59,062	50,077	53,325	54,266	60,580	63,247	71,329	78,044
July	63,906	54,606	49,867	55,119	66,170	60,076	73,441	81,428
Aug.	63,575	48,793	51,880	55,618	70,058	66,729	72,089	80,351
Sept.	59,768	50,093	49,707	56,318	64,529	62,268	71,384	76,159
Oct.	58,412	50,094	53,111	53,154	55,708	66,637	73,277	75,164
Nov.	54,670	50,729	50,703	54,967	53,543	61,345	64,158	72,560
Dec.	53,568	39,250	48,695	52,250	49,745	61,101	67,506	72,162
Total	667,505	589,110	568,238	633,482	696,333	735,417	795,015	871,200

Source: U. S. Bureau of Mines

Reclaimed Rubber

(Including Natural and Synthetic)

(All Quantities in Long Tons)

Year	Production	Consumption—Tons	Consumption—% to Crude [a]	Exports	Stocks On Hand at End of Period
1936	150,571	141,486	24.6	7,085	19,000
1937	185,033	162,000	29.8	13,233	28,800
1938	122,400	120,800	27.6	7,403	23,000
1939	186,000	170,000	28.7	12,611	25,250
1940	208,971	190,244	29.3	11,347	32,636
1941	274,202	251,231	32.2	13,851	41,750
1942	286,007[b]	254,820	64.6	30,405	42,532
1943	304,058[c]	291,082	59.6	15,678	46,201
1944	260,631[d]	251,083	35.3	11,800	43,832
1945	243,309	241,036	30.2	13,413	28,155
1946	295,612	275,410	26.5	14,461	33,666
1947	291,395	288,395	24.8	14,556	35,943
1948	266,827	272,194	26.2	10,953	34,702
1947:					
July	21,252	20,433	26.8	1,052	39,704
Aug.	21,658	21,093	24.4	1,414	40,130
Sept.	22,561	23,801	25.6	902	38,461
Oct.	25,648	26,735	26.3	1,016	36,643
Nov.	23,145	23,425	25.7	1,339	36,347
Dec.	25,123	25,229	25.4	1,437	35,943
1948:					
Jan.	25,634	25,885	25.5	768	36,307
Feb.	23,678	22,374	25.9	1,273	38,444
Mar.	24,089	24,362	26.0	937	38,313
Apr.	21,802	22,322	26.2	1,049	37,946
May	21,043	21,975	25.2	948	36,612
June	22,504	23,786	25.1	925	35,898
July	17,712	19,291	23.2	712	34,302
Aug.	20,255	22,917	24.7	643	32,025
Sept.	21,805	23,478	25.7	740	30,198
Oct.	23,859	23,512	26.7	848	31,879
Nov.	23,050	22,170	24.8	1,210	33,378
Dec.	21,396	20,122	24.9	900	34,702

Source: 1936-40, Department of Commerce; 1941 to date, Rubber Division, OMD, and Predecessor Agencies.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. [a] Includes natural and synthetic rubber. [b] Includes 893 tons of imports. [c] Includes 67 tons of imports. [d] Includes 21 tons of imports.

Automobile Production in U. S.

(Civilian Production Only)

Year	Passenger Cars	Trucks	Total	Year	Passenger Cars	Trucks	Total
1930	2,784,745	571,241	3,355,986				
1931	1,973,090	416,648	2,389,738	1940	3,692,328	721,637	4,413,965
1932	1,135,491	235,187	1,370,678	1941	3,744,500	875,381	4,619,681
1933	1,573,512	346,545	1,920,057	1942	220,814	133,083	353,897
1934	2,177,919	575,192	2,753,111	1943	0	4,501	4,501
1935	3,252,244	694,690	3,946,934	1944	0	124,819	124,819
1936	3,669,528	781,862	4,451,390	1945	83,792	313,643	397,435
1937	3,915,889	892,382	4,808,271	1946	2,148,599	930,760	3,079,459
1938	2,000,985	485,852	2,486,837	1947	3,558,178	1,220,634	4,778,812
1939	2,866,796	704,308	3,571,104	1948	3,909,270	1,363,856	5,273,126
1948:							
Jan.	305,081	99,200	404,281	July	356,764	116,780	473,544
Feb.	274,847	107,054	381,901	Aug.	348,782	111,760	460,542
Mar.	349,998	140,606	490,604	Sept.	301,170	111,224	412,394
Apr.	308,071	128,963	437,034	Oct.	383,756	107,352	491,108
May	225,461	111,789	337,250	Nov.	364,440	103,837	468,277
June	312,406	117,572	429,978	Dec.	378,455	107,702	486,157
1949:							
Jan.	326,019	104,607	430,626	July	.....	.....	.....
Feb.	.....	.....	.....	Aug.	.....	.....	.....
Mar.	.....	.....	.....	Sept.	.....	.....	.....
Apr.	.....	.....	.....	Oct.	.....	.....	.....
May	.....	.....	.....	Nov.	.....	.....	.....
June	.....	.....	.....	Dec.	.....	.....	.....

Source: Automobile Manufacturers Association.

Note: Figures are based on factory sales. Revisions are made from time to time in these figures and the latest issue should be consulted for accuracy.

Rim Production

	1944	1945	1946	1947	1948
Passenger Car	1,748,917	4,504,368	15,058,469	21,346,004	23,842,796
Truck & Bus	6,391,441	6,386,652	5,939,244	7,737,353	6,920,231
Agricultural	997,301	1,441,909	1,735,992	2,633,699	3,140,882
Earth Mover	703	1,308	5,520	10,610	13,330
Total	9,138,362	12,434,237	22,739,225	31,727,666	33,917,239

	1948					1949
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
Passenger Car	2,164,158	1,787,181	1,948,651	2,078,140	2,199,967	2,037,345
Truck & Bus	501,308	505,616	505,452	529,768	584,768	516,123
Agricultural	208,471	327,644	230,830	263,785	273,831	290,645
Earth Mover	352	1,635	394	935	1,629	1,676
Total	2,874,289	2,621,576	2,685,327	2,872,628	3,060,195	2,845,789

Source: The Tire & Rim Association, Inc.

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Automotive Pneumatic Casings

(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1936 (total)	21,446	30,866	1,073	53,385	56,041	10,717
Passenger Car	18,941	26,999	644	46,584	49,013	9,291
Truck and Bus	2,505	3,867	429	6,801	7,028	1,426
1937 (total)....	22,353	29,886	1,246	53,485	53,310	10,383
Passenger Car	20,055	26,177	696	46,928	46,497	8,745
Truck and Bus	2,298	3,709	550	6,557	6,813	1,638
1938 (total) ...	11,516	30,567	1,049	43,132	40,907	8,451
Passenger Car.	10,086	27,104	580	37,770	35,789	6,937
Truck and Bus	1,430	3,463	469	5,362	5,118	1,514
1939 (total)	18,208	38,022	1,279	57,509	57,613	8,665
Passenger Car.	15,742	33,471	607	49,820	49,933	7,108
Truck and Bus	2,466	4,551	672	7,689	7,680	1,557
1940 (total)	22,252	35,346	1,176	58,774	59,186	9,127
Passenger Car.	19,560	30,903	411	50,874	50,965	7,270
Truck and Bus	2,692	4,443	765	7,900	8,221	1,857
1941 (total)	24,780	39,895	1,489	66,164	61,540	4,436
Passenger Car.	19,855	34,119	586	54,560	50,392	3,165
Truck and Bus	4,925	5,776	903	11,604	11,148	1,271
1942 (total)	6,680	8,872	207	15,759	15,351	6,247
Passenger Car.	910	2,734	38	3,682	2,790	4,432
Truck and Bus	5,770	6,138	169	12,077	12,561	1,815
1943 (total)	6,128	18,547	225	24,900	20,423	1,883
Passenger Car.	82	10,606	71	10,759	7,620	1,132
Truck and Bus	6,046	7,941	154	14,141	12,803	751
1944 (total)	6,654	26,439	263	33,356	33,446	2,013
Passenger Car.	208	18,330	130	18,668	18,819	1,218
Truck and Bus	6,446	3,109	133	14,688	14,627	795
1945 (total)	5,984	36,479	504	42,967	44,524	3,077
Passenger Car.	1,115	25,463	222	26,800	28,200	2,214
Truck and Bus	4,869	11,016	282	16,167	16,324	863
1946 (total)	15,310	65,490	1,512	82,312	82,298	2,448
Passenger Car.	11,086	54,684	653	66,423	66,466	1,763
Truck and Bus	4,224	10,806	859	15,889	15,832	685
1947 (total)	25,056	62,871	3,256	91,183	95,550	6,949
Passenger Car.	19,644	52,857	1,608	74,109	77,795	5,444
Truck and Bus	5,412	10,014	1,648	17,074	17,755	1,505
1948 (total)	26,840	49,126	1,808	77,775	81,368	10,722
Passenger Car.	21,582	41,275	659	63,517	66,780	8,789
Truck and Bus	5,528	7,851	1,149	14,258	14,588	1,933
1948:						
Oct. (total)	2,436	3,899	156	6,492	6,750	9,905
Passenger Car.	2,043	3,175	56	5,276	5,560	8,002
Truck and Bus	393	724	99	1,216	1,190	1,903
Nov. (total)	2,335	3,139	118	5,592	6,098	10,476
Passenger Car.	1,946	2,506	51	4,503	4,980	8,516
Truck and Bus	389	632	67	1,089	1,118	1,960
Dec. (total)	2,299	2,953	191	5,442	5,715	10,722
Passenger Car.	1,897	2,351	72	4,320	4,610	8,789
Truck and Bus	402	601	119	1,122	1,105	1,933

Source: The Rubber Manufacturers Association, Inc.

Cotton, Rayon and Nylon Tire Fabrics

(Production in Thousands of Pounds)

	Cotton				Rayon and Nylon [b]		
	Tire Cord Not Woven	Cord Fabric Woven	Chafer and All Other Tire Fabrics	Total	Tire Cord Not Woven	Tire Cord And Other Tire Fabrics	Total
1945:							
Jan.-Mar.	16,671	43,835	12,306	72,812	3,726	37,777	41,503
Apr.-June	16,044	42,383	13,604	72,031	4,064	42,476	46,540
July-Sept.	15,136	38,158	14,122	67,416	3,549	42,606	46,155
Oct.-Dec.	15,514	36,442	13,573	65,529	a	47,734	47,734
Total	63,365	160,818	53,605	277,788	11,339	170,593	181,932
1946:							
Jan.-Mar.	17,128	39,377	15,245	71,750	a	51,208	51,208
Apr.-June	19,622	40,197	18,623	78,442	a	52,511	52,511
July-Sept.	17,279	39,259	18,787	75,325	5,102	46,932	52,034
Oct.-Dec.	20,660	42,668	21,708	85,036	5,858	50,589	56,447
Total	74,689	161,501	74,363	310,553	10,960	201,240	212,200
1947:							
Jan.-Mar.	21,972	49,377	21,815	93,164	5,322	52,059	57,381
Apr.-June	23,491	53,746	16,480	93,717	5,486	47,360	52,846
July-Sept.	15,571	44,291	14,596	74,458	6,161	51,719	57,880
Oct.-Dec.	18,183	48,532	17,762	84,477	6,550	55,078	61,628
Total	79,217	195,946	70,653	345,816	23,519	206,216	229,735
1948:							
Jan.-Mar.	18,546	50,251	19,391	88,188	a	60,569	60,569
Apr.-June	15,585	45,385	18,213	79,183	a	59,759	59,759
July-Sept.	29,865	45,927	c	75,792	a	63,642	63,642
Oct.-Dec.	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....

Source: U. S. Bureau of the Census.

Notes: (a) Included with tire cord and fabrics to avoid disclosures of operations of individual mills. (b) Fuel cell fabrics are not included with rayon and nylon tire cord and fabrics. (c) Included with tire cord not woven.

Automotive Inner Tubes

(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1936	21,514	32,188	721	54,423	57,036	10,945
1937	22,464	29,554	749	52,767	52,373	10,312
1938	11,515	28,134	644	40,293	37,848	8,166
1939	18,190	31,998	1,002	51,190	50,649	7,036
1940	22,172	29,070	972	52,214	52,237	7,017
1941	24,722	33,749	1,232	59,703	57,433	4,686
1942	6,895	7,213	159	14,267	12,685	6,206
1943	6,350	12,474	189	19,014	15,014	2,626
1944	6,460	20,569	196	27,224	27,488	2,813
1945	5,988	33,906	411	40,304	41,742	3,627
1946	15,327	59,357	1,424	76,108	77,251	3,820
1947	25,046	46,560	2,483	74,088	79,181	8,059
1943	26,839	40,494	1,125	68,457	70,150	9,734
1948:						
Mar.	2,363	2,731	94	5,188	5,534	9,930
Apr.	2,264	3,456	88	5,807	5,578	9,737
May	1,814	3,516	89	5,419	5,702	10,069
June	2,218	4,421	107	6,745	6,716	9,939
July	2,365	4,365	78	6,807	5,750	8,760
Aug.	2,292	4,522	103	6,917	6,639	8,533
Sept.	2,112	4,007	81	6,200	6,191	8,778
Oct.	2,432	3,537	91	6,061	6,323	8,915
Nov.	2,344	2,694	86	5,123	5,463	9,303
Dec.	2,290	2,308	124	4,722	5,034	9,734

Source: The Rubber Manufacturers Association, Inc.

Smoked Sheets—Spot Closing Prices

(New York Market—Cents per pound)

Year	High	Low	Avg.	Year	High	Low	Avg.
1910	288	141	206.60	1930	16½	7½	11.98
1911	184	114	141.30	1931	8⅝	4¼	6.17
1912	140	108	121.60	1932	4¾	2½	3.49
1913	113	59	82.04	1933	9⅞	2⅞	5.96
1914	93	56	65.33	1934	15⅞	8¾	12.92
1915	79	58½	65.85	1935	13¾	10½	12.37
1916	102	55	72.50	1936	23	13½	16.41
1917	90	52	72.23	1937	26⅞	14	19.39
1918	70	40	60.15	1938	17⅞	10¼	14.64
1919	57	38½	48.70	1939	24	14⅛	17.57
1920	56½	16	36.30	1940	24	18¼	20.10
1921	21¼	11½	16.36	1941	24⅞	19⅛	22.40
1922	28¾	13⅝	17.50	1942	22½	22½	22.50
1923	37⅛	24¾	29.45	1943	22½	22½	22.50
1924	40⅛	17⅝	26.20	1944	22½	22½	22.50
1925	121	34⅜	72.46	1945	22½	22½	22.50
1926	88½	36¾	48.50	1946	22½	22½	22.50
1927	41¾	33	37.72	1947	25	14	20.00
1928	41½	17	22.48	1948	25	18	21.99
1929	26⅞	15½	20.55				

Note: Price was fixed by Government on August 6, 1941, at 22½c a pound for non-war uses. Free trading was resumed May 1, 1947.

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market—in Cents)

Average Monthly Price Per Pound

	1942	1943	1944	1945	1946	1947	1948	1949
Jan.	19.85	21.34	20.76	22.36	25.49	32.58	36.09	33.37
Feb.	20.05	21.61	21.34	22.29	26.57	33.91	33.63	33.41
Mar.	20.42	21.98	21.65	22.43	27.52	35.89	35.04	....
Apr.	21.10	22.02	21.71	21.88	28.40	35.89	38.10	....
May	20.88	21.97	21.63	23.30	28.17	36.51	38.57	....
June	19.78	21.92	23.31	23.42	29.89	37.83	38.12	....
July	20.27	21.46	22.33	23.27	34.11	38.03	34.89	....
Aug.	19.45	21.09	22.11	23.10	36.31	34.83	32.23	....
Sept.	19.62	21.10	22.10	23.25	37.59	32.21	31.92	....
Oct.	19.79	21.00	22.32	23.85	36.79	32.39	32.01	....
Nov.	20.21	20.32	22.13	24.71	31.50	34.50	32.15	....
Dec.	20.55	20.32	22.28	25.21	33.03	36.74	32.90	....
Average for Year	20.16	21.34	21.89	23.25	31.28	35.11	34.64	....

Consumption of Vinyl Resins

(In Thousands of Pounds)

	Sheeting and Film [a]	Textile and Paper Coating Resins [b]	Molding and Extrusion Materials [b]	All Other [b, c]
1946	52,080	11,673	61,852	27,083
1947	66,430	17,237	73,114	27,064
1948:				
Apr.	7,468	2,938	6,725	2,066
May	6,351	2,318	5,680	1,597
June	7,194	2,089	4,312	1,594
July	6,893	2,593	4,142	1,368
Aug.	8,291	2,613	5,361	1,834
Sept.	10,298	2,924	5,920	1,845
Oct.	11,364	2,981	5,666	1,859
Nov.	10,099	2,588	6,533	2,014
Dec.	8,761	2,472	7,068	1,808

Source: Bureau of the Census.

Notes: (a) Includes weight of fillers, plasticizers, extenders and safety glass sheeting; (b) Resin content; (c) Includes Adhesives, but excludes data for protective coating resins.

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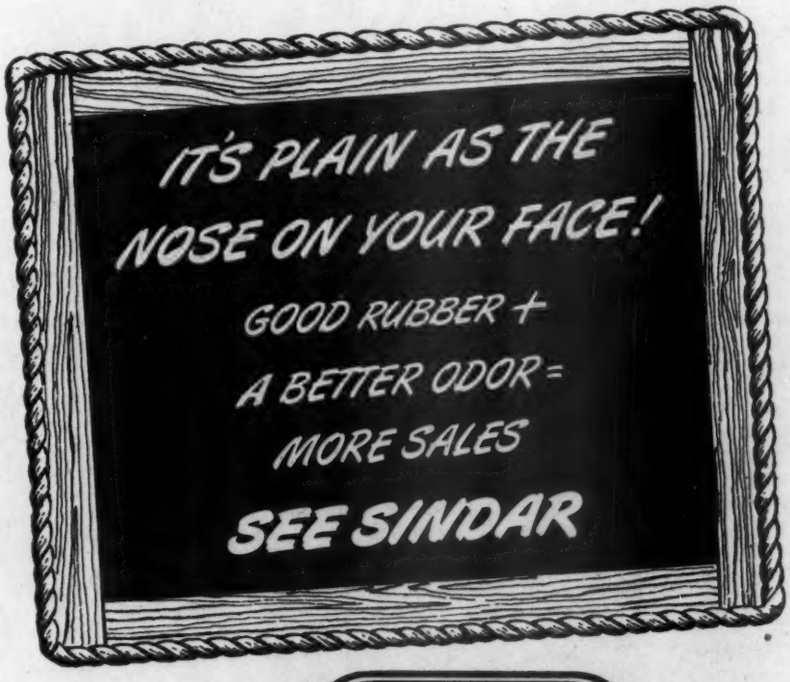

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Rubber Industry Employment, Payrolls, Wages and Hours

Employment — Thousands of Production Workers and Index (1939 = 100)

	1947				1948			
	All Rubber Products		Rubber Tires & Tubes		All Rubber Products		Rubber Tires & Tubes	
Month	Number	Index	Number	Index	Number	Index	Number	Index
Jan.	240	198.8	110	235.5	210	173.5	106	185.5
Feb.	240	198.2	109	233.3	208	172.0	99	182.4
Mar.	238	196.5	108	231.4	204	168.9	96	177.7
Apr.	234	193.5	106	227.0	198	163.8	93	170.7
May	223	184.5	102	220.0	195	161.1	91	168.5
June	207	170.9	106	195.1	195	161.6	92	169.4
July	200	165.1	103	186.9	191	157.7	91	167.6
Aug.	203	167.9	105	193.0	195	160.9	92	168.7
Sept.	203	168.1	101	185.2	197	162.8	91	168.6
Oct.	208	171.7	102	188.0	198	163.5	90	165.9
Nov.	210	174.0	102	188.7	199	164.5	91	168.2
Dec.	212	175.3	102	187.8	196	161.8	..	....

Note: Figures from June, 1947, to date have been revised to adjust them to levels indicated by Federal Security Agency data for 1946; revisions for January-May, 1947, will be shown later.

Payrolls — Production Workers Pay Rolls Unadjusted Index (1939 = 100)

	1946		1947		1948	
Month	All Rubber Products	Rubber Tires & Tubes	All Rubber Products	Rubber Tires & Tubes	All Rubber Products	Rubber Tires & Tubes
Jan.	290.1	272.6	386.3	416.3	354.9	344.4
Feb.	292.1	271.9	385.0	413.3	337.2	315.4
Mar.	298.2	281.1	374.3	397.3	320.6	292.4
Apr.	319.7	312.9	383.9	414.2	312.8	286.4
May	322.1	314.2	367.2	399.3	318.9	305.7
June	331.4	318.3	342.3	356.2	330.2	322.0
July	321.4	304.3	331.2	350.0	329.7	329.8
Aug.	336.9	311.2	337.6	355.5	347.2	341.0
Sept.	363.9	348.9	348.3	355.3	344.9	326.2
Oct.	361.3	346.1	354.4	354.7	345.5	318.2
Nov.	377.4	360.3	361.4	362.4	341.9	312.9
Dec.	392.2	368.9	373.6	365.6	....	....

Note: Figures from June, 1947, to date have been revised to adjust them to levels indicated by Federal Security Agency data for 1946; revisions for January, 1946, through May, 1947, will be shown later.

Wages — Average Weekly Earnings

	1946		1947		1948	
Month	All Rubber Products	Rubber Tires & Tubes	All Rubber Products	Rubber Tires & Tubes	All Rubber Products	Rubber Tires & Tubes
Jan.	$46.71	$50.29	$54.03	$59.78	$57.33	$62.72
Feb.	46.05	49.21	54.06	59.90	54.70	58.22
Mar.	46.46	49.72	52.97	58.05	53.24	55.54
Apr.	49.67	54.77	55.23	61.64	53.39	56.54
May	49.82	54.72	55.30	61.12	55.45	61.15
June	50.45	54.82	55.49	61.35	57.14	63.96
July	50.60	56.11	55.74	62.06	58.37	66.30
Aug.	51.03	55.42	55.92	61.15	60.47	68.29
Sept.	53.69	59.89	57.76	64.75	59.31	65.27
Oct.	51.74	57.38	57.62	63.78	59.25	64.82
Nov.	52.93	58.87	57.99	64.86	58.32	62.79
Dec.	54.63	60.46	59.47	65.74	....	....

Wages — Average Hourly Earnings

	1946		1947		1948	
Month	All Rubber Products	Rubber Tires & Tubes	All Rubber Products	Rubber Tires & Tubes	All Rubber Products	Rubber Tires & Tubes
Jan.	$1.121	$1.255	$1.330	$1.511	$1.444	$1.646
Feb.	1.129	1.266	1.331	1.517	1.421	1.613
Mar.	1.138	1.275	1.330	1.512	1.408	1.599
Apr.	1.232	1.414	1.397	1.608	1.412	1.603
May	1.266	1.446	1.416	1.622	1.424	1.636
June	1.283	1.461	1.419	1.615	1.439	1.651
July	1.292	1.472	1.445	1.640	1.472	1.684
Aug.	1.295	1.474	1.445	1.640	1.500	1.730
Sept.	1.323	1.507	1.447	1.661	1.504	1.732
Oct.	1.313	1.492	1.436	1.644	1.508	1.734
Nov.	1.322	1.503	1.453	1.661	1.510	1.735
Dec.	1.331	1.513	1.454	1.658	....	....

Hours — Average Weekly Hours per Worker

Month	1946	1947	1948	Month	1946	1947	1948
January	41.7	40.6	39.7	July	39.2	38.6	39.7
February	40.8	40.6	38.5	August	39.4	38.7	40.3
March	40.8	39.8	37.8	September	40.6	39.9	39.4
April	40.3	39.5	37.8	October	39.4	40.1	39.3
May	39.4	39.0	39.0	November	40.1	39.9	38.6
June	39.3	39.1	39.7	December	41.2	40.9	...

Source: U. S. Department of Commerce. Note: These figures are revised from time to time and the latest available issue should be consulted for the most accurate data.

Indexes of Production, Shipments and Inventory For The Rubber Industry

Production 1935-1939 = 100 (Based on man-hours)

Month	1946	1947	1948	Month	1946	1947	1948
Jan.	215	247	223	July	211	207	200
Feb.	216	246	215	Aug.	221	210	207
Mar.	221	239	205	Sept.	234	217	206
Apr.	219	234	200	Oct.	234	223	205
May	215	220	201	Nov.	243	225	203
June	218	216	205	Dec.	252	230	200

Shipments—Average Month 1939 = 100 (Based on $ Value)

Jan.	211	301	282	July	278	298	339
Feb.	214	326	289	Aug.	292	312	351
Mar.	223	332	252	Sept.	321	346	345
Apr.	291	320	312	Oct.	344	348	344
May	297	309	317	Nov.	324	354	330
June	302	322	342	Dec.	363	307	349

Inventory — Average Month 1939 = 100 (Based on $ Value)

Jan.	171	229	271	July	187	268	289
Feb.	177	241	283	Aug.	191	258	287
Mar.	183	253	302	Sept.	197	246	288
Apr.	190	270	293	Oct.	204	347	284
May	188	279	296	Nov.	207	242	288
June	185	277	295	Dec.	209	257	302

Source: U. S. Department of Commerce.

Various Compounding Materials Consumed by the Rubber Industry

Material	1941	1942	1943	1944	1945	1946	1947
Asphalt [a]							
Short tons	20,536	22,263	16,510	20,189	19,483	28,715	32,113
% of total	0.6	0.6	0.5	0.6	0.5	0.7	0.7
Barite (Barytes):							
Short tons	9,800	6,334	8,000	10,000	10,000	20,000	17,000
% of total	4.2	3.6	3.9	2.9	2.1	4.4	3.1
Carbon Black:							
Short tons	219,751	147,974	236,737	369,015	402,193	470,732	471,790
% of total	88.5	88.5	90.3	94.6	95.5	95.3	94.3
Clay, Kaolin:							
Short tons	127,0555	51,334	50,964	59,588	109,936	162,393	166,201
% of total	11.6	5.1	5.5	6.8	11.7	12.3	12.0
Clay, Fire & Stoneware:							
Short tons	9,000	5,000	10,259	7,160	7,800	12,951	.....
% of total	0.2	0.1	0.2	0.1	0.1	0.2	..
Lead Sulfate, Basic:							
Short tons	200	89	131	268	200	.....	.....
% of total	1.9	1.1	2.3	4.2	5.2	..	..
Lime:							
Short tons	3,058	1,381	2,039	5,634	7,170	3,193	.....
% of total	0.05	0.02	0.05	0.13	0.10	0.1	..
Litharge:							
Short tons	3,968	3,460	4,302	3,023	1,864	2,131	.....
% of total	3.3	3.8	3.8	2.2	1.3	1.6	..
Lithopone:							
Short tons	3,547	1,047	1,078	726	977	1,607	3,085
% of total	2.0	0.8	0.8	0.5	0.7	1.1	1.1
Mica, Ground:							
Short tons	3,476	1,754	3,063	1,137	3,715	4,951	.....
% of total	8.0	3.7	6.0	2.2	7.0	8.0	..
Sulfur:							
Short tons	63,000	40,000	51,000	63,000	64,960	72,800	.....
% of tgotal	2.4	1.4	1.8	1.9	2.0	2.2	..
Talc [b]							
Short tons	58,114	40,487	48,994	51,833	63,758*	65,980	.....
% of tgotal	13.9	10.0	11.8	13.0	16.0	14.4	..
Zinc Oxide:							
Short tons	90,429	52,717	67,898	59,518	63,447	83,776	.....
% of total	63.4	53.0	47.4	42.3	49.6	53.1	..

Source: U. S. Bureau of Mines.
Notes: (a) Solid and semi-solid products of less than 200 penetration. (b) Includes pyrophyllite and ground soapstone. * Revised.

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RUBBER CHEMIST—Must be fully versed in the problems of compounding natural and synthetic rubber, for plant in western Pennsylvania making a specialty of made-to-order molded goods, wrapped goods, and roll coverings, and factory control of stocks through production. State full qualifications, references, wages required, etc., in your reply. Address Box 346-W, RUBBER AGE.

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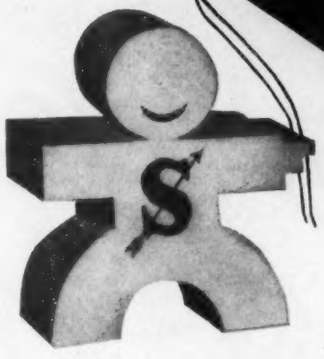

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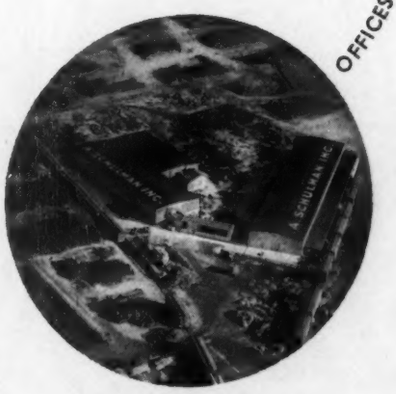

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